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MYRON NILE FORD.

The great grandfather of the President of the National Association of Boards of Pharmacy was a native of Maryland and a pioneer settler of Champaign County, Ohio. The father of the subject of this sketch moved to Marion Township, in Allen County, where Nile was born July 5, 1882. The home of young Ford, until his majority, was on his father's farm on which a stone quarry was located. He assisted in the farm work and in preparing the stone of the quarry for the public highway. His earlier education was received in the Township schools and, later, he attended Ohio Northern University at Ada. Thereafter the young man matriculated at Scio College of Pharmacy, of which Dr. J. H. Beal was then the dean. On completion of his college work, in 1906, Mr. Ford was awarded the first prize for pharmaceutical laboratory work—membership in the AMERICAN PHARMACEUTICAL ASSOCIATION. He returned to his home county and found employment with King Bros. in Delphos; later, he accepted a position in King and Williams Pharmacy, and, after completing the years of apprenticeship, qualified as a pharmacist by passing the State Pharmacy Board examination; here he continued until 1912, when he was named Secretary of the Ohio State Board of Pharmacy.

Secretary Ford exhibits a deep interest in everything that pertains to pharmacy, both in national and state affairs. When he first assumed the duties of office all the work devolved on him, now there are two inspectors who visit all sections of the state in the discharge of their duties and two assistants aid the Secretary in his office at Columbus.

The work of Mr. Ford pointed him out as one qualified for the presidency of the National Association and, at the meeting in Des Moines, he was thus honored. The Association has his services for this year which, no doubt, will be marked by his careful and painstaking efforts for pharmacy and the N. A. B. P.

Mr. Ford married Miss Goldie Mae Friedline, of Delphos, in 1913; Mrs. Ford died in 1920 and is survived by a son and daughter. President Ford is active in both Scottish and York Rite Masonry, as a Knight of Pythias, and a member of the Methodist Church.

E. G. E.

EDITORIAL

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THE "OLD YEAR" AND THE "NEW YEAR."

THE terms "Old Year" and "New Year" have no meaning in the abstract sense—they are designations by which we refer to the past with which we have been in contact and a time during which we hope to accomplish something that to us seems worth while.

During the period of 1925 pharmacy has made progress, and expression was given to this, in a brief and general way, in an editorial of the December JOURNAL, A. PH. A. There is before us another period during which the work begun must be carried forward and onward by pharmacy and the AMERICAN PHARMACEUTICAL ASSOCIATION. Not only must the activity relating to the Headquarters continue, in order to bring the project to accomplishment, but other work of the ASSOCIATION must be directed so that pharmacy may be even better served than in the past.

The AMERICAN PHARMACEUTICAL ASSOCIATION is an organization for comprehensive service; all other organizations relating to the drug trade are concerned with certain proposals or to accomplish results whereby their members profit. In order to bring about continued success these organizations must seek the point of contact with other bodies so there may be, as far as possible, coördinated coöperation, and this made possible through the AMERICAN PHARMACEUTICAL ASSOCIATION, and therein is, perhaps, its greatest service. When this is once fully understood greater benefits to pharmacy will result. There are questions of importance that concern every organization and relative to which there are differences of opinion—one profits, another is affected otherwise; a more satisfactory adjustment (for all) may be brought about within a representative body like the A. PH. A., in which all may have an equal voice. This is part of the work which will become of greater usefulness when divisional organizations fully realize the opportunities open to them in the AMERICAN PHARMACEUTICAL ASSOCIATION. The completion of the Headquarters' Fund, of course, is part of the plan, and a most important one, and in that connection the progress has been and is most encouraging.

The offices of the ASSOCIATION have now been located at 10 West Chase Street, Baltimore, Md. This is a step toward coördinated service for pharmacy and of the ASSOCIATION activities. The work will go forward. It is to be remembered that the organization functions for the body-pharmaceutic and also that a large membership is an essential of its complete success and a delegate body truly representative of pharmacy and the drug business in general. The individual viewpoint should have as the objective a general service and mutual benefits wherein the public also shares.

E. G. E.

LIKING ONE'S EPOCH.

A PARIS newspaper sent out to various men and women of distinction, in France, the question, "Do you like our epoch?"

A few expressed positively their love for the age in which they live, the greater number were dissatisfied, some even detested the period.

The results of a questionnaire seeking data on how votaries liked their work, trade, or profession would not differ so greatly, relatively, from those elicited from the men and women of distinction referred to.

We have a part in shaping our lives, but while our efforts as individuals are essential, our activities are influenced by those of others, environment, government, conditions, prosperity, etc. The work of pharmacy will go forward with a fixed purpose on the part of pharmacists to serve in a larger way.

The AMERICAN PHARMACEUTICAL ASSOCIATION exists for the body-pharmaceutic—a large membership is an essential for its successful endeavors. As has been stated, the individual viewpoint should be one of general service looking toward mutual benefits wherein the public also shares. Let us counsel and work together so that the AMERICAN PHARMACEUTICAL ASSOCIATION may meet the highest expectations. E. G. E.

A BUSINESS ARTICLE WORTH READING.

BY PAUL C. OLSEN.

Department of Business Management, JOURNAL A. PH. A.

"Advertising as an incentive to human progress," by Bruce Barton; *Advertising and Selling Fortnightly*, November 4, 1925, pp. 25ff. In an interesting and common-sense way the author tells how advertising helps to make the world a better place to live in.

SEASONABLE DISPLAYS FOR JANUARY AND FEBRUARY.

Prescription department	First aid kits
Lung protectors	Hospital supplies
Chamois vests	Combs and brushes
Medicine cases	Face creams and lotions

GOVERNMENT AND BUSINESS.

President Coolidge, in his address before the New York Chamber of Commerce last month, said that there should be the largest possible independence between Government and business. "Each ought to be sovereign in its own sphere," he said. "When Government comes unduly under the influence of business, the tendency is to develop an administration which closes the door of opportunity; becomes narrow and selfish in its outlook, and results in an oligarchy. When Government enters the field of business with its great resources, it has a tendency to extravagance and inefficiency, but, having the power to crush all competitors, likewise closes the door of opportunity and results in monopoly. It is always a problem in a republic to maintain on the one side that efficiency which comes only from trained and skillful management without running into fossilization and autocracy, and to maintain on the other that equality of opportunity which is the result of political and economic liberty without running into dissolution and anarchy. The general results in our country, our freedom and prosperity, warrant the assertion that our system of institutions has been advancing in the right direction."

SCIENTIFIC SECTION

THE ASSAY OF SALICYLATES AND BENZOATES.*

BY A. H. CLARK.

The ideal in any quantitative analysis is 100% accuracy and the ideal and only accurate result is one which accounts for 100% of all the material present. In order to accomplish this a method must be theoretically perfect. Many times, in practice, no attempt is made to attain the ideal and this is particularly the case in the methods of the United States Pharmacopœia. Nearly all the determinations of the Pharmacopœia depend upon the isolation of only one constituent of the compound or mixture under examination. This idea is carried out in the determination of acids where the hydrogen ion only is titrated; in the titration of bases where the hydroxyl ion only is determined; in the determination of the purity of halide salts by titration with silver; in the determination of the purity of organic salts of sodium and potassium by ignition, and in other ways. Such methods have their faults but these faults are common to them all and a better and more accurate method would be the determination of all the constituents present. From the standpoint of the Pharmacopœia this is neither convenient nor necessary because the tests for identity and purity exclude foreign material which might interfere with the accuracy of the determination.

In accord with the above reasoning any method for the assay of salicylates and benzoates which determines with accuracy either the metal or the acid radical is satisfactory. The only way to prove the accuracy of a method is to try it on samples of known purity or upon samples which are prepared in such a way that they are certain to be pure. The testing of a method upon commercial samples is worthless because it is a well-known fact that commercial products are not intended to be theoretically perfect in composition but may contain small quantities of foreign material. This principle is recognized by the Pharmacopœia when it sets a limit for impurities in almost every case where assay methods are prescribed. The important thing is an accurate method for the determination of one or more of the constituents present and then the Pharmacopœia may place whatever limit it decides is reasonable on the amount of foreign materials permitted.

For the work recorded here pure samples of sodium salicylate, sodium benzoate and ammonium benzoate were prepared. The sodium salicylate was prepared by recrystallizing a commercial sample from solution in hot absolute alcohol. The truth of the statement made above regarding the character of commercial samples was very clearly evidenced in the preparation of the pure sodium salicylate. One of the commercial samples used for this purpose gave solutions in alcohol that were very highly colored and showed the presence of appreciable quantities of splinters of wood, dirt and the like. In this case it was necessary to recrystallize from absolute alcohol three or four times to secure

* The work recorded here was started some time ago in the University of Illinois School of Pharmacy and concluded in the University of Michigan College of Pharmacy during the summer session of 1925.

a specimen which seemed free from foreign material. Other samples required but one or two crystallizations.

It was a much more difficult matter to prepare a pure sample of sodium benzoate. This was finally accomplished by neutralizing an alcoholic solution of benzoic acid with sodium hydroxide and carefully washing the precipitated sodium benzoate with alcohol and ether and then drying to constant weight at 110° C.

A pure ammonium benzoate was quite readily prepared by neutralizing an alcoholic solution of benzoic acid with ammonia and very carefully washing the precipitated ammonium benzoate with alcohol and finally with ether and drying in a desiccator.

The melting point of the acid extracted was determined in every case and was taken as an index of the purity of the sample.

Numerous methods have been proposed for the determination of the purity of these salts among which are colorimetric ones; methods depending upon the ignition of the salt and titration of the carbonate; methods depending upon the conversation of sodium to sulphate or chloride; methods depending upon the isolation of the acid and either weighing or titrating it; volumetric methods in which the aromatic group is determined by absorption of iodine or bromine and finally a few gravimetric methods have been proposed. A discussion of those methods which have been tested and the results reported in this paper are given below.

METHODS.

1. Ignition and Titration of Carbonate Formed. (*a*) *U. S. P. VIII and IX Modifications.*—Simple ignition of the salt and leaching out of the carbonate formed and its subsequent titration is the procedure directed in U. S. P. VIII. Since experience showed this method to be quite unsatisfactory for benzoates and salicylates it was thought that a general method of assay for organic salts of alkali metals might be included in the U. S. P. IX by a slight modification of it. The modification consists in adding to the charred mass an excess of standard acid, boiling for one-half hour, filtering and determining the acid consumed by titration with standard alkali. Even this has not proven satisfactory for benzoates and salicylates and is unnecessary for salts of other organic acids.

(*b*)—For a great many years the writer has used a slight modification of the simple ignition process which consists in moistening the original charred mass with a few drops of water, drying and igniting once more and if necessary repeating this moistening and drying until a residue perfectly white and free from carbon is obtained. The carbonate is then added to water and titrated directly with standard acid. This procedure is entirely satisfactory for all alkali metal salts excepting benzoates and salicylates and the U. S. P. X has adopted practically the same procedure as a general method but directs for the latter a special procedure which is as follows:

(*c*) *U. S. P. X Method.*—This method is a modification of the U. S. P. IX procedure in which after charring the salt, treating it with excess of standard acid, boiling, filtering, etc., the filter and carbon are again ignited, the ash thus obtained being added to the standard acid and the titration of the excess acid with alkali completed, using methyl orange as an indicator. This procedure is

exceedingly cumbersome and time-consuming, requiring by count of time actually spent as much as one hour. Aside from this it is rather difficult to avoid errors due to loss during the boiling and the subsequent filtrations and to the difficulties due to the use of methyl orange as an indicator.

The writer has been very much interested in the cause of the failure of the usual methods in the case of benzoates and salicylates when they work so well with other salts. Many efforts have been made to discover some plausible explanation for this fact but at the present time there is nothing definite to offer.

2. Conversion of the Sodium into a Salt. (*a*) *Into Sulphate.*—The usual procedure for the determination of sodium as sulphate when applied to this problem works very well. It is not nearly so simple, however, as the method outlined later under *2b*. Dr. Lyons' (1) procedure for the determination of sulphate is cumbersome and rather time consuming and in the writer's opinion has no special advantages over the regular sulphate determination.

(*b*) *Weighing the Metal as Chloride.*—While this method is frequently mentioned in connection with sodium benzoate and salicylate, the writer has never seen any special directions for carrying out the determination. The following procedure has proven satisfactory. A quantity of the salt, about one Gm., is placed in a tared dish, preferably of platinum, dissolved in a small amount of water and an excess of strong hydrochloric acid added. The dish with its contents is then placed on a steam- or water-bath and heated to near dryness. It is then transferred to a hot plate or to an oven heated to about 120° C. until all the acid is expelled and then gently ignited and weighed as sodium chloride. In the case of ammonium benzoate it is necessary to dissolve the sample in water and transfer the solution to a separator and add a liberal quantity of ether and shake until the acid has dissolved. The solution of ammonium chloride is then drawn into a tared dish, the ether washed two or three times with water and then the combined washings and solution evaporated to dryness and dried in an oven at 100° to constant weight. Care must be taken when the dish is placed on the steam-bath to avoid loss by spattering when the dissolved ether escapes from the solution as it becomes heated. This method applied to sodium salts is very simple and exclusive of the time required for the weighings will not consume five minutes of the operator's time.

3. Extraction of Acid.—This in some form is about the oldest and most widely used method of all.—(*a*) Moerk and Ehman (2) extracted the acid and without removal of the solvent titrated it with alkali using phenolphthalein as indicator. There are some objections to the titration of benzoic and salicylic acids with sodium hydroxide and phenolphthalein as indicator. The U. S. P. directs the use of barium hydroxide in this titration. The authors do not state whether their results were obtained on purified or commerical samples. Their results range from 98.088 to 100.12 per cent on sodium salicylate and from 99.063 to 97.41 on sodium benzoate. These are not very concordant results and unless a method gives better results than this it is not very satisfactory since the Pharmacopœia requires a purity of 99.5 per cent in the case of sodium salicylate and 99 per cent for sodium benzoate. Any suitable method must surely give results agreeing within a range of 0.5 per cent. This method was not tried.

(*b*) *Weighing of the Acid.*—This method has been criticized by Taub (3) on the

ground that it may give results which are too high due to the retention of the solvent, or results that are too low, due to the loss of acid during the evaporation. In the writer's experience both benzoic and salicylic acid can be extracted after its liberation by means of hydrochloric acid and accurately weighed by proceeding as follows:

About 1 Gm. of the sample is dissolved in water and transferred to a separator and an excess of hydrochloric acid added. The liberated benzoic or salicylic acid is extracted with chloroform (*ether, because of its tendency to take up water, will not answer*) taking care that no moisture is carried along with the chloroform. This can be best accomplished by drawing the chloroform through a pledget of cotton placed in the stem of a small funnel and moistened with chloroform. The chloroform is collected in a tared dish and set aside to evaporate spontaneously. If the extraction is made in the late afternoon the dish may be set aside and usually the chloroform will have completely evaporated by morning. The dish with the acid is then placed in a desiccator for an hour or more and weighed. A little experience will enable one to select a location in the laboratory where this evaporation will take place over night. It has been found after numerous trials that the drying in a desiccator is not always necessary, in many cases the loss being negligible.

4.—This method is a combination of *2b* and *3b* and is the ideal method since it recovers all of the constituents. A weighed quantity of the sample, about 1 Gm., is dissolved in water and transferred to a separator and an excess of hydrochloric acid added. The liberated acid is extracted with chloroform as described under *3b*. The solution of chloride remaining in the separator is drawn off into a tared dish, the separator washed with several small portions of water and the combined washings and solution evaporated and weighed according to *2b*.

5. Volumetric Methods. (*a*) *By Absorption of Bromine.*—This method is applicable to salicylates only, since benzoates do not absorb bromine quantitatively. These methods have been severely criticized and have been the subject of much study. Fresenius and Grünhut (4) state that they give only fair results. Seidell (5) made a very thorough study of them and concluded that the results were decidedly variable while A. and H. Taub (3) found Jones' (6) modification to be the most applicable of *all* the methods of determination. This method is essentially that of the U. S. P. for the assay of phenol. A solution of the salicylate is added to $N/10$ bromine V. S. and the mixture acidulated. After 15–20 minutes potassium iodide is added and the bromine not absorbed is determined by titration with thiosulphate. In the experience of the writer this bromine absorption method is unreliable, giving results which are decidedly variable depending upon the factors of time, acidity, and concentration.

(*b*) *Methods Depending upon the Absorption of Iodine.*—In the author's experience the absorption of iodine by phenols and similar bodies is exceedingly uncertain, the results depending upon the relation between the iodine and the quantity of substance being determined as well as upon the alkalinity of the mixture. This was pointed out by Puckner and Clark (7) and has been a subject of very thorough study by Seidell. (8) Other analysts seem to agree that the method is too uncertain to be of very much value. It was not tried on any of the samples used in these experiments.

The results obtained by the various methods tried are given below.

SODIUM SALICYLATE.

Quite a number of assays were made by methods *1a*, (U. S. P. VIII and IX) and also Method *1b*. Results were invariably low in some cases as low as 95 per cent while the usual result was from 98 to 99 per cent.

Method *1c*. Many assays were made by this method and the results were found to be quite variable as shown in the following table. It was thought that better results might be obtained with a platinum dish but upon trial it was found that it had little if any influence on the results.

Results obtained by the other methods tried are shown in the table.

	Methods.					
	1b.	*1c.*	*2b.*	*3b.*	*4.*	*5a.*
Sodium Salicylate, pure	99.43	99.52	99.86	99.79		99.45
	99.46	98.73	100.00	99.80		97.05
	99.24	101.00	99.65	99.95		99.63
	99.59	99.05	99.94	99.91		99.96
		with Pt	99.89	99.87		96.95
		dish	100.08	99.64		
		99.32	100.03			
		98.53	100.03			
		99.91	99.55			
Commercial samples		97.40	99.71	99.28		
		98.24	99.91	99.34		
		97.61	99.22	100.25		
		99.42	99.38	100.11		
		99.75	99.71	100.13		
		98.63				
		98.33				
		100.43				
		100.65				
		99.84				
		98.42				
		with Pt				
		dish				
		99.01				
		98.63				
		98.90				
Sodium Benzoate, pure		98.70	100.02	100.02	99.85 &	
		98.30	99.97	99.16	99.82	
			99.46		100.05 &	
					99.73	
					99.66 &	
					99.95	
					99.38 &	
					99.64	
					99.60 &	
					100.16	
Commercial samples		99.38	99.77	100.99		
		97.30	100.22	100.60		
			99.60			
Ammonium Benzoate, pure			99.91	99.95	100.30 &	
			99.72	99.86	99.90	
					100.03 &	
					100.10	

CONCLUSIONS.

These results show that in the assay of sodium salicylate, sodium benzoate and ammonium benzoate most accurate and uniform results are obtained by either weighing the metal as chloride or extracting the liberated benzoic acid with chloroform and weighing it. If a method of general application is desired, the extraction of the acid and weighing it is the only advisable one. It is quite unlikely that lithium, mercury, or strontium could be weighed as chloride. In addition to its accuracy, Method *2b*, the weighing of the metal as chloride, is exceedingly simple and time saving. Determinations upon the sodium salts by this method require practically no time beyond that of the two weighings necessary.

Acknowledgment is made to Mrs. Frances Stogis of the University of Illinois School of Pharmacy for her careful and conscientious work in making many of the determinations, especially those on sodium salicylate.

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TOXICITY OF QUININE-ASPIRIN MIXTURE ON WARM-BLOODED ANIMALS.*

BY E. A. RUDDIMAN AND C. F. LANWERMEYER.

At the meeting of the ASSOCIATION one year ago, we presented a paper to this section on the Toxicity of Quinine-Aspirin Mixture.[1] The frog was the test-animal in the work reported on at that time. It was suggested that different results might be obtained on warm-blooded animals. This paper presents the results of the work done during the past year on rats and guinea-pigs.

Referring to the report of last year (JOUR. A. PH. A., November 1924, 1009) we find that the minimum fatal dose of the freshly made Quinine-Aspirin Mixture (quinine alkaloid two parts to aspirin three parts) was about 0.00017 gram per gram body-weight of the frog and that the minimum fatal dose of the old Quinine-Aspirin Mixture (after it has changed to the brown-red mass) is 0.00016 gram. There is only a difference of 0.00001 gram, which might easily be due to experimental error on the part of the operator, and the variation of action on the animal.

Consequently, we can say that the old Quinine-Aspirin Mixture is no more toxic for the frog than the freshly prepared mixture.

The animals used this year were white rats and guinea-pigs. The rats were reared in our own laboratory; were all in healthy condition; were between three and four months old and weighed from 61 to 175 grams. Sixty-one rats were

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* Read before Scientific Section, A. PH. A., Des Moines meeting, 1925.

[1] JOUR. A. PH. A., November 1924, p. 1009.

used. The guinea-pigs used were about half grown, weighing from 175 to 300 grams. Sixteen pigs were used.

The Quinine-Aspirin Mixture used was composed of two parts of quinine alkaloid to three parts of aspirin. In this paper, when reference is made to an "old quinine-aspirin mixture" it refers to a mixture which was kept for about a year and a half and had changed to a brown-red mass.

The solvent used was ethylene glycol seventy-five parts and water twenty-five parts. The proportions of quinine to aspirin and of ethylene glycol to water were the same as used last year. At that time it was found that ethylene glycol is one of the best solvents, having but little toxic effect. The toxicity of this compound was further reduced by the addition of 25 per cent of water, which was about the maximum amount of water that could be added without causing precipitation.

The solution used for the rats contained 5 per cent of the Quinine-Aspirin Mixture and the solution for the pigs contained 10 per cent. The stronger solution was used on the larger animal in order to keep the volume of liquid to be injected as small as possible. These solutions were made up fresh, consequently quite a number of solutions were used. The twenty-four hour period of observation was chosen more or less arbitrarily, although if the animal lived twenty-four hours it would generally recover.

In the case of the frog, the solution was injected into the lymph sac under the tongue. In the case of the rats and guinea-pigs the solution was injected hypodermically into the abdomen by means of a tuberculin syringe graduated to 0.01 cc., care being used not to puncture the abdominal cavity.

Solutions of Quinine and Aspirin alone were not used in this series of experiments as our object was to determine the relative toxicity of the fresh and the old mixture.

TABLE I.—EFFECT OF A FRESHLY MADE QUININE-ASPIRIN MIXTURE ON RATS.

Rat no.	Wt. of rat.	Cc. given.	Gm. per Gm. body-weight.	Results after 24 hours.
3	116 Gm.	0.40	0.00017	Alive
4	200 Gm.	0.72	0.00018	Alive
5	217 Gm.	0.83	0.00019	Alive
6	217 Gm.	1.08	0.00025	Alive
7	242 Gm.	1.45	0.0003	Alive
27	136 Gm.	0.82	0.0003	Alive
11	61 Gm.	0.39	0.00032	Alive
28	160 Gm.	1.02	0.00032	Alive
59	112 Gm.	0.72	0.00032	Alive
67	78 Gm.	0.50	0.00032	Alive
74	157 Gm.	1.01	0.00032	Alive
12	76 Gm.	0.50	0.00033	Dead
13	54 Gm.	0.36	0.00033	Alive
60	94 Gm.	0.62	0.00033	Alive
10	60 Gm.	0.41	0.00034	Dead
29	118 Gm.	0.80	0.00034	Dead
61	90 Gm.	0.61	0.00034	Alive
68	105 Gm.	0.72	0.00034	Alive
73	156 Gm.	1.06	0.00034	Alive
9	135 Gm.	0.95	0.00035	Dead

TABLE I.—(*Continued.*)

62	83 Gm.	0.60	0.00036	Alive
69	114 Gm.	0.82	0.00036	Alive
72	150 Gm.	1.08	0.00036	Alive
63	87 Gm.	0.66	0.00038	Alive
66	85 Gm.	0.65	0.00038	Alive
71	138 Gm.	1.05	0.00038	Alive
8	133 Gm.	1.06	0.0004	Dead
64	108 Gm.	0.86	0.0004	Alive
65	85 Gm.	0.68	0.0004	Alive
70	130 Gm.	1.04	0.0004	Alive
75	89 Gm.	0.73	0.00041	Dead
76	85 Gm.	0.72	0.00042	Dead
77	84 Gm.	0.73	0.00043	Alive
78	76 Gm.	0.67	0.00044	Dead
79	101 Gm.	0.89	0.00044	Dead

The minimum fatal dose is approximately 0.0004 gram per gram body-weight, although we find four rats dying within twenty-four hours when smaller doses (0.00033, 0.00034, 0.00034 and 0.00035 gram) were given. These exceptions are not to be wondered at when we consider the fact that in the human being there is a great variation in the amounts of any one medicine which can be taken.

TABLE II.—EFFECT OF AN OLD QUININE-ASPIRIN MIXTURE ON RATS.

Rat no.	Wt. of rat.	Cc. given.	Gm. per Gm. body-weight.	Results after 24 hours.
16	66 Gm.	0.40	0.0003	Alive
18	160 Gm.	0.96	0.0003	Alive
22	144 Gm.	0.86	0.0003	Alive
15	53 Gm.	0.34	0.00032	Alive
23	147 Gm.	0.94	0.00032	Alive
58	115 Gm.	0.78	0.00034	Alive
17	117 Gm.	0.82	0.00035	Alive
24	150 Gm.	1.05	0.00035	Alive
57	83 Gm.	0.58	0.00035	Alive
52	100 Gm.	0.72	0.00036	Alive
25	127 Gm.	0.94	0.00037	Alive
53	93 Gm.	0.69	0.00037	Alive
45	114 Gm.	0.87	0.00038	Alive
51	164 Gm.	1.25	0.00038	Dead
54	91 Gm.	0.69	0.00038	Alive
49	170 Gm.	1.33	0.00039	Dead
55	90 Gm.	0.70	0.00039	Dead
19	123 Gm.	0.98	0.0004	Dead
26	142 Gm.	1.14	0.0004	Alive
44	108 Gm.	0.87	0.0004	Dead
50	130 Gm.	1.04	0.0004	Dead
56	83 Gm.	0.67	0.0004	Alive
80	94 Gm.	0.77	0.00041	Dead
81	88 Gm.	0.74	0.00042	Dead
82	81 Gm.	0.70	0.00043	Dead
83	105 Gm.	0.92	0.00044	Dead

The minimum fatal dose can be placed at about 0.0004 gram of mixture per gram body-weight, two rats having survived and three succumbed to this dose. One died with a dose of 0.00038 and two with a dose of 0.00039. From these

results we came to the conclusion that there is practically no difference in the toxicity of a fresh and an old mixture of Quinine-Aspirin on the white rat.

TABLE III.—EFFECT OF A FRESHLY MADE QUININE-ASPIRIN MIXTURE ON GUINEA-PIGS.

Pig no.	Wt. of pig.	Cc. given.	Gm. per Gm. body-weight.	Results after 24 hours.
4	196 Gm.	0.59	0.0003	Alive
7	308 Gm.	1.08	0.00035	Alive
9	273 Gm.	1.01	0.00037	Alive
6	252 Gm.	0.96	0.00038	Alive
8	206 Gm.	0.81	0.00039	Alive
5	256 Gm.	1.03	0.0004	Dead
22	175 Gm.	0.72	0.00041	Dead
23	238 Gm.	1.00	0.00042	Dead

The minimum fatal dose of the fresh mixture is about 0.0004 gram per gram body-weight.

TABLE IV.—EFFECT OF AN OLD QUININE-ASPIRIN MIXTURE ON GUINEA-PIGS.

Pig no.	Wt. of pig.	Cc. given.	Gm. per Gm. body-weight.	Results in 24 hours.
11	283 Gm.	0.99	0.00035	Alive
15	236 Gm.	0.85	0.00036	Alive
14	262 Gm.	0.97	0.00037	Alive
13	231 Gm.	0.88	0.00038	Alive
12	266 Gm.	1.04	0.00039	Alive
10	248 Gm.	1.00	0.0004	Dead
20	266 Gm.	1.09	0.00041	Dead
21	200 Gm.	0.84	0.00042	Dead

The minimum fatal dose of the old mixture is the same as of the fresh mixture, about 0.0004 gram per gram body-weight.

The conclusion from these experiments is that the old Quinine-Aspirin Mixture is no more toxic on the white rat or guinea-pig than the freshly made mixture.

The difference in the size of the fatal dose for the frog and that for the rat or pig may be due to some extent to the difference of administration. Absorption may not be as fast from hypodermic injection as by injection into the lymph sac.

A 5-grain capsule of the old mixture was given orally to a kitten weighing 297 grams. It lived over the twenty-four hours.

A dog weighing about 9.5 Kg. was given ten 5-grain capsules of the old mixture in a period of twenty-four hours, having been previously starved for twelve hours. He showed no apparent ill effect and ate a hearty meal three hours after the last capsule.

If the effect of these fresh and old mixtures on the human body is similar to that on the lower animals, there is no danger in giving this combination even though it is not absolutely fresh. However, it is probably better to use only the fresh mixture because the aspirin is not then decomposed into its constituents.

In the paper given last year some comments were made on the length of time required for a mixture of quinine and aspirin to become massed and to assume a brown-red color. In January 1924, mixtures were made of aspirin with quinine sulphate, quinine alkaloid, quinine bisulphate, quinine hydrochloride, quinidine sulphate, quinidine alkaloid, cinchonine sulphate, cinchonine alkaloid, cinchonidine

sulphate and cinchonidine alkaloid. Some samples of the alkaloids were first dried, some mixed with citric acid as well as aspirin, some mixtures kept in the light and some in the dark, some kept in tightly sealed containers and some exposed to the air. On examining these mixtures, after standing for a year and a half there is not a sufficient uniformity in results to draw any definite conclusion. In some cases, citric acid seemed to hasten reaction and in others not. The drying of the alkaloid or its salt seemed to retard change to some extent. The mixtures containing free alkaloids started to react more quickly than in case of their salts, but in several instances the massing was not as great at the end of a year and a half.

The change seems to go through the following stages:

> A damp powder, becoming dried and caked, then contracted and of a dirty white color, then a granular mass of dirty yellow-brown color and later a clear mass, too stiff to pour, and of a brown-red color. When the samples had progressed far enough to cake, the odor of acetic acid was quite noticeable, becoming stronger as the reaction went on.

Quinine Sulphate.—All samples had massed except two, in which the salt had been previously dried. The color of most of them was a dirty yellowish gray; none had become brown-red.

Quinine Alkaloid.—All samples had become yellow-brown and had either contracted or had massed.

Quinine Bisulphate.—All mixtures were white, some were in the form of a sticky powder or had caked. None were contracted or massed and all had a little acetic odor.

Quinine Hydrochloride.—The mixtures with starch had not massed; all others had.

Quinidine Sulphate.—All samples had become massed and of a light yellow-brown color.

Quinidine Alkaloid.—All samples had become contracted, but had not massed to any extent. The color was a dirty white. The reaction was not as great as in the case of the sulphate.

Cinchonine Sulphate.—All mixtures had massed. Some had become clear and of a brown-red color. others were granular masses. The results were practically the same as in case of quinidine sulphate.

Cinchonine Alkaloid.—These samples were about the same as those containing the sulphate.

Cinchonidine Sulphate.—The mixtures had not changed as much as those of cinchonine sulphate. Some had massed while quite a number were damp powders.

Cinchonidine Alkaloid.—Reaction seemed to have progressed a little farther than in the case of cinchonidine sulphate.

SUMMARY.

(1) The four cinchona alkaloids and their common salts, when mixed with aspirin and allowed to stand for as much as a year and a half, have changed to a mass. The most pronounced exception to this statement is in case of quinine bisulphate. None of the combinations of this salt had changed more than to a sticky powder, none had gone to the next stage—that of contraction.

(2) A quinine-aspirin mixture, which has been kept until it has changed to a brown-red mass, is no more toxic to several of the lower animals than the freshly made mixture.

LABORATORY OF JOHN T. MILLIKEN
AND COMPANY.

HYDROLYSIS OF THE CRUDE PROTEIN FROM LIQUOR FOLLICULI.*[1]

BY BRYANT FULLERTON AND FREDERICK W. HEYL.

In a recent publication[2] it was noted that the precipitation of liquor folliculi with alcohol yielded crude protein to the extent of 6.34%. This crude protein, which may of course consist of a mixture has been subjected to the Van Slyke process and the nitrogen distribution determined. The tyrosine and tryptophane content has also been determined colorimetrically. The results of our analysis are tabulated below; and also those showing the composition of the albumin of ovarian residue, of mammary gland and casein for purposes of comparison.

	Follicular fluid.	Albumin ovarian residue.	Mammary[3] gland.	Casein.
Total N	100.0	100.00	100.00	100.00
Amide N	8.3	7.80	5.50	10.27
Humin N	1.9	1.44	2.50	1.28
Arginine N	12.6	11.60	11.10	7.41
Cystine N	0.95	0.70	....	0.20
Histidine N	0.00	0.20	4.66	6.21
Lysine N	14.80	14.69	12.47	10.30
Mono Amino N	61.4	60.55	57.17	55.81
Non Amino N	1.5	3.08	6.40	7.13

	Follicular fluid.	Albumin ovarian residue.
Tyrosine	7.1%	8.5
Tryptophane	2.5%	2.1
Molisch test	−	+

In the first place, it is very difficult (except in sulphur content) to decide whether the protein of the follicular fluid is actually different from that of the ovary itself. While the former does not give the Molisch test, the positive test in ovarian protein may be due to absorption of positively testing material. It does not appear that any great alterations of structure, such as are noted in comparing casein and mammary gland, have been produced by the secretory process.

The analysis of mammary gland protein is really not comparable because in this hydrolysis no effort was made to separate the soluble proteins. It appears, however, that the arginine (12.6% N) is very similar to that found in various other organs; the absence of histidine is a conspicuous difference; lysine is somewhat higher than for any other organ protein except placenta.[4]

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* From the Chemical Research Laboratory, The Upjohn Company.

[1] Received for publication December 1, 1925.

[2] JOUR. A. PH. A., XIV, 210 (1925).

[3] See Harding and Fort, *J. Biol. Chem.*, 35, 37 (1918).

[4] *J. Biol. Chem.*, 35, 37 (1918).

EXPERIMENTAL.

The crude protein was analyzed with the following results:

0.6247 Gm. lost at 110°, 0.0511 Gm. or 8.18% moisture.

0.2032 Gm. gave 0.0027 Gm. or 1.32% ash.

A quantity equivalent to 0.2049 Gm. ash and moisture free protein gave 0.0169 Gm. $BaSO_4$ or 1.13% S.

A quantity equivalent to 0.1936 Gm. ash and moisture free protein gave 0.0373 Gm. $PbMoO_4$ or 0.13% P.

Hydrolysis.—A quantity of this material equivalent to 3.1544 Gm. ash and moisture free protein was hydrolyzed by boiling with 100 cc. of 20 per cent hydrochloric acid for about 26 hours. Nitrogen estimations showed 14.97, 14.70, 14.51 and 14.44% N taking 14.65% N as an average. (Amino N = 13.31 and 13.34%.) For the check analysis a quantity equivalent to 3.5758 Gm. ash- and moisture-free protein was used. In calculating, the results tabulated below have been corrected for the solubilities of all the phosphotungstates.

	Analysis Crude Protein. Found.		Parts per 100.[1]
Total Nitrogen	14.65	15.28	100.00
Amide N	1.22	1.61	8.3
Humin N	0.28	0.26	1.9
Arginine N	1.85	1.81	12.6
Cystine N	0.14	0.14	0.95
Histidine N	0.00	0.00	0.00
Lysine N	2.17	2.07	14.8
Mono Amino N	8.99	8.95	61.4
Total Filtrate N	9.21	9.45	....
Non Amino N	0.22	0.50	1.5
			101.45

Although the histidine N, calculated according to the Van Slyke method is zero, the base solution responded to the Pauly diazo test. In comparing the colors thus produced with a standard histidine dichloride solution, this base appeared to be present to the extent of about 0.1%.

The analysis of the decomposed phosphotungstates gave the following figures:

	I.	II.
Total Base N	0.1057 = 4.02	0.1262 = 4.16
Arginine N	0.0476 = 1.81	0.05605 = 1.85
Amino N	0.0759 = 2.88	0.0858 = 2.84
Non Amino N	0.0298 = 1.14	0.0404 = 1.32
Cystine N	0.0038 = 0.14	0.0042 = 0.14

From these figures we calculate the percentage of hexone bases as follows:

	I.	II.
Arginine	5.62	5.75
Histidine	0.00	0.00
Lysine	10.79	11.32

It is observed that the calculation for histidine in both analyses yields negative quantities although from the Pauly test, its presence may be suspected. It is not impossible that the phosphorus present in the crude protein might be present

[1] Calculated on first analysis.

as nucleic acid and that a small quantity of purines have been precipitated with the hexone bases.

Determination of Tyrosine and Tryptophane.—These were determined colorimetrically, tyrosine by the method of Folin and Looney[1] was present to the extent of 7.1%. By the method of May and Rose[2] we found tryptophane = 2.5%.

The Molisch test gave negative results.

SUMMARY.

Hydrolysis of the crude total protein of follicular fluid showed the presence of Arginine, 5.7%; histidine, trace; lysine, 11.0%; tryptophane, 2.5%; tyrosine, 7.1%. All of these values very closely approximate those of the albumin ovarian residue. The latter contains appreciably more sulphur (1.5%), only 1.1% being found in the protein of follicular fluid.

KALAMAZOO, MICHIGAN,
NOVEMBER 9, 1925.

CHEMICAL EXAMINATION OF OVARIAN RESIDUE.*,[1]

I. THE PROTEIN FRACTION.

BY BRYANT FULLERTON[2] AND FREDERICK W. HEYL.

When, in general, any glandular material is extracted in the cold with water or dilute saline solutions, a precipitate is usually produced upon acidification (acetic acid). Preparations of this class have been classified by Samuely[3] in two groups (*a*) "cell globulins" and (*b*) tissue or cell nucleoproteins. Under (*a*) it is noted that from liver tissue of horse or cat, from kidney, spleen, lymph cells, testicles and thymus, such preparations have upon analysis shown from 0 to 1.3% phosphorus. Approximately the same substances are also listed under (*b*). Perhaps one should infer that if, on treating such extracts with methods suitable for the precipitation of globulins, a nonphosphorus compound results, we have a "cell globulin." For instance, from thyroid gland extracts, such a substance can be prepared.

Such substances, when containing phosphorus are best classified according to Jones[4] as α nucleoproteins, and they are probably variable colloidal mixtures or salt like combinations of cell globulins or albumins with nucleic acid.[5] In Osborne's work on wheat embryo, it was shown that such extracts contain both albumin (leucosin) and globulin associated with nucleic acid.

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[1] *J. Biol. Chem.*, 51, 421 (1922).

[2] *J. Biol. Chem.*, 54, 213 (1922).

* From the Chemical Research Laboratory of the Upjohn Company.

[1] Received for Publication December 1, 1925.

[2] This paper is based upon the thesis presented by Mr. Fullerton to the Faculty of Kalamazoo College, in partial fulfillment of the requirements for the degree of Master of Science.

[3] "Abderhalden's Hand-lexikon IV," p. 93 and 130.

[4] "The Nucleic Acids."

[5] "Pohl, Abder. Handbuch, V," 665 reports positive pentose reaction for liver nucleoproteins. See Fleugel, 1919.

In recent years interest in this fraction has lagged. Rather the nucleic acid has absorbed almost all the attention. It is generally held that such preparations do not represent true constituents of the cell, and Wells[1] has shown that any antigenic properties that they have are dependent upon the protein component. He goes further and states that these labile proteins are not specific for the cells in which they are found.

These proteins have not been hydrolyzed and the chemist cannot form an opinion on their specificity. As these unorganized proteins are readily soluble, in distinction to the major part of the cell contents, and since most of the metabolic changes may be assumed for that reason to revolve about them, some knowledge of their chemical make up is certainly of interest. Pohl has hydrolyzed liver nucleoprotein and compared the nitrogen distribution with the labile blood protein and believes they are not identical. That these proteins are labile and readily altered for metabolic purposes is shown by the fact that whilst in hunger the total protein of the liver increases, there is a marked destruction of the α nucleo protein fraction.

If after the tissue has been thus exhausted, a further extraction is made with dilute alkalies, further quantities of protein material are extracted, which may in turn be precipitated more or less completely with acetic acid. These also contain phosphorus, but it has been the custom not to include these among the so-called α nucleoproteins. In one of the more recent studies with this procedure McGregor[2] reported on the composition of the proteins of the central nervous system. When the extraction of this material is begun with water or dilute saline solutions, about 5% of protein was dissolved; subsequently 10% more was extracted with very dilute alkaline solutions. The phosphorus in the former proteins amounted to about 0.1% and in the latter 0.6%.

When the first aqueous or saline extracts are precipitated with acetic acid the protein is incompletely thrown down and has a variable composition depending upon the nature of the solution. The protein precipitated from alkaline solution is said to be uniform.

Reviewing the methods of preparation of substances listed under the title of α nucleoproteins we find that in some instances, these have been isolated by beginning at once to extract the gland with dilute alkalies. By way of illustration we may mention some examples of both processes.

Source.	Extraction fluid.	P %.	
Brain	NH_4Cl solution	0.56	Levene
Liver	Water	1.45	Halliburton
Suprarenal	2% ammonia	4.71	Jones & Whipple
Kidney	Salt Solution		
	Water	0.37	
Ox pancreas	Dilute saline	1.67	
Pig pancreas	Ammonia	5.05	Jones & Whipple
	Ammonium Acetate		Gamgee & Jones
Thymus	Water	5.23	
		0.97	
Spleen	Dilute $NaHCO_3$	1.2 to 1.8%	Levene & Mendel

[1] *J. Biol. Chem.*, 28, 11 (1917); *Z. Immunitäts.*, 19, 599 (1913).
[2] *J. Biol. Chem.*, 28, 403 (1917).

It appears to us that these variations confuse the study. With the exception of the confusing work on thymus extracts most of the interest in this work has been centered in the nucleic acids. Perhaps the nucleic acid is the same in every gland like that of thymus nucleic acid which contains 8.94% phosphorus.

However, these various preparations are without a doubt, not different salts of the same protein and the same nucleic acid. There is every reason to believe that various proteins are present, but with the exception of the above-mentioned work on thymus where an interesting histone was shown to be present, no extensive attention has been given to the protein fraction. It does indeed present difficulties which, since the work of Neuman and Kossel on nucleic acid has caused the interest to swing to the nucleic acid side, and with remarkably progressive results.

When glandular tissue is extracted with boiling solvents, coagulating the proteins and perhaps some protein nucleate, the filtrate contains organic phosphorus in non-coagulable form. This precipitates when acidified with acetic acid and these are the so-called β nucleoproteins of which, that studied by Hammarsten (1894) is the classic example. Similar nucleoproteins have been obtained as follows:

	Precipitated by.	% P.	
Mammary	Acetic acid	0.28%	Odenius
Spleen	Acetic acid	?	Levene
Liver	Acetic acid	3.06	Wohlgemuth
Ox pancreas	Acetic acid	4.98	

There is reason to believe that the phosphorus in these preparations is not derived from ordinary thymus nucleic acid, but from guanylic acid $H_2PO_4.C_5H_8O_3$ $C_5H_4N_5O$ (P = 7.67%) and that this is the source of pentose sugar reactions in animal extracts. The protein moiety is apparently a non-coagulable mucoid-like substance, perhaps somewhat similar in different tissues.

The materials extracted from glandular tissues with dilute alkalies have not, we believe, been classified as a group, but they are just as much amenable to such classification as the "glutelins" of the plant proteins. It will prove interesting to compare these with the mucoid substances. However, it is not impossible that this protein is the same as the soluble fraction, except that it is physically altered by the nucleic acid combination.

The residue left from the above-mentioned solvents may be termed the albuminoids of the tissue, the term "stromin" being frequently applied to the alkali soluble proteins (*e. g.*, "neurostromin").

We have applied these general principles to ovarian residue. We find that the proteins may be divided among the several above-mentioned groups as follows:

	Per cent.
Water soluble	6.8
Saline soluble (in addition)	4.3
Proteose[1]	1.2
Soluble in 0.1% alkali	10.3
Soluble in 1% (additional)	12.6
Albuminoids	22.0
Total isolated	57.2

[1] Calculated as N $\times$ $6^1/_4$ of the alcohol precipitable protein in the filtrates after coagulation.

The cold-water extract yielded without difficulty protein preparations which were practically phosphorus free. In terms of Abderhalden's nomenclature we would have here a "cell globulin." The material, however, instead of conforming to the solubility requirements of the globulin group is much more properly classified as an albumin. Most of it is precipitable at half saturation with ammonium sulphate, is not precipitated upon dialysis and can be isolated by heat coagulation.

Some protein remains in solution which has been half saturated with ammonium sulphate. It can be precipitated by increasing the acidity. It appears to be a further quantity of the same albumin contaminated perhaps by a non-protein moiety or a small amount of a nucleic acid (P = 0.2%). This protein is free from iron, in contrast to small amounts of globulin-like material which can be separated from the main albumin fraction.

It should be added that evidence was obtained of the presence of a non-coagulable mucoid in the filtrates from the albumin in the water extract. These preparations were not uniform in composition tending to lower carbon content.

The study of the saline extracts failed to reveal the presence of any conspicuous amount of a native globulin. In fact the presence of a native globulin is doubtful. A globulin-like artifact appears to form at the expense of the coagulable albumin.

The variations in composition and alterations in solubility of the other proteins which, like the globulins, might be associated with the albumin are reminiscent of the serum-globulin fractionation studies which lead to Fibrinoglobulin, Euglobulin and pseudoglobulin and insoluble globulins.

Comparison of our analytical results by the Van Slyke process with those obtained by Lock and Thomas[1] on serum albumin and serum globulin show the protein of the gland to differ materially from the serum proteins, especially in the matter of histidine content.

	Total N.	Amide N.	Histidine N.	Arginine N.	Lysine N.
Serum albumin	100.0	5.18	5.71	9.11	12.88
Serum globulin	100.0	5.55–6.01	2.6–3.0	9.5–8.3	8.2–8.5
Ovarian albumin	100.0	7.8	0.2	11.6	14.69

Most of the phosphorus can be precipitated from a saline extract (made subsequent to a water extract) when acidified. The crude protein thus precipitated amounts to over 3 per cent of the glandular material and contains 1.39% phosphorus. We have not hydrolyzed this to prove the presence of nucleic acid.

A direct saline extract, upon dialysis, yields alteration products, one of which has globulin-like properties. From the salt-free solution the characteristic ovarian residue albumin was isolated and the presence of mucoid was again demonstrated.

EXPERIMENTAL.

Effect of Preliminary Extractions on Subsequent Protein Extraction of Ovarian Residue.—Ether extracted 8.53%. Cold absolute alcohol extracted 6.0% solids further, of which the non-lipoidal part amounts to approximately 4.0%. This extract contains N = 0.21% of the tissue. Cold 95% alcohol extracts 9.8% solids containing 0.42% N; while boiling 95% alcohol extracts 11.7% solids and 0.58% N.

[1] *Z. physik. Chem.*, 87, 78 (1913).

In order to find out what preliminary extractions might be permitted before the subsequent protein study, we have extracted separate samples amounting to 5.0 Gm. of the tissue as follows: (*a*) with ether; (*b*) ether followed by 95% alcohol; (*c*) with ether followed by absolute alcohol, 75% alcohol, 95% alcohol, absolute alcohol, and finally with ether. In each case the extracted residues which had been extracted with volatile solvents, were extracted three times with 10% salt solution and estimations were made of the α nucleo-protein, coagulable protein in the filtrate, and of non-protein nitrogen. Then the stromin proteins were extracted with 1.0% sodium hydroxide solution at 4° C. and lastly the albuminoids were weighed as residue. The results obtained may be tabulated as follows:

Sample.	α Nucleo-protein %.	Coagulable protein %.	Non-protein nitrogen %.	Non-protein N soluble in 90% alcohol.
A	3.6[1]	6.95	0.95	0.75
B	2.5	4.70	0.63	0.35
C	0.64	none	0.28	0.14

Sample.	Soluble in 1% alkali.	Residue %.	Filtrate from stromin % N.
A	20.5[2]	25.9	
B	24.8	23.1	1.07
C	22.43	35.3	

From these preliminary results it is at once evident that a prior alcohol (95%) extraction at once decreases the saline soluble proteins and they now appear in the alkali soluble protein extract. A considerable extraction in a preliminary way, as in C, causes the saline protein extract to be almost protein free and in this case the proteins are found in the residue.

NATURE OF THE PROTEINS.

A. The Water Extract.—The dilute water extract is sufficiently free from salts, so that very little protein is precipitable upon acidification, and furthermore it could not be coagulated. When sodium chloride was added to the aqueous extract a precipitate resulted upon acidification and again on heating. The liquid freed from protein material by both means still contained appreciable amounts of material giving the biuret test.

A quantity of ether extracted ovarian residue equivalent to 5 grams of glandular material was extracted with three successive portions of water and the volume made up to 250 cc. (p_H = 5.8). This extract was divided into three parts of 100, 100 and 50 cc. each.

To the 50 cc. aliquot, 5 Gm. NaCl was added, acetic acid equivalent to 0.1% and the solution was heated to coagulation: *total precipitable material* 6.78%.

The 100 cc. aliquots were treated with 10 Gm. salt and precipitated with 0.05% and 0.15% acetic acid. The precipitate at a concentration of 0.05% amounted to 0.66%; at 0.15% the precipitate amounted to 1.55% more, making a total of 2.2% of protein precipitable. Another determination at 0.25% acetic acid gave 2.4%.

From the filtrates from these fractions precipitable with acetic acid, heat coagulated 4.74% (4.38) further.

[1] Is phosphorus-free. By α nucleoprotein we mean precipitable with acetic acid.

[2] Dried at 110°; contains 0.58% P.

The filtrate from this coagulum contained nitrogen equivalent to 0.82% of the gland. This solution gave a red biuret test.

Unless salt is added as above, it was found that acidification of the extract yielded a precipitate amounting to only 1.4% and the filtrate cannot be coagulated upon heating. In another experiment only 0.44% precipitated upon acidification and coagulation, while 6.76% further was precipitated from the filtrate of the coagulation with 90% alcohol. This precipitation was practically complete at 70 vol. % alcohol.

It was found that concentrated aqueous extracts could not be filtered through Mandler filters, an appreciable part of the protein being held back and clogging the pores. Extracts prepared in this way gave very little precipitate with ammonium sulphate at 3/10 to 4/10 saturation.

PREPARATION OF PROTEIN FRACTIONS FROM AQUEOUS EXTRACT.

Two hundred Gm. fat free tissue (219 Gm. ovarian residue) was agitated with 3 liters of cold distilled thymol water for one hour, and allowed to stand in the ice chest for about one hour. The extract was removed by centrifugation; filtered through pleated filters, and through Mandler thimbles. The filtrate measured 2760 cc. It was half saturated with ammonium sulphate in substance and allowed to stand over night at 4°.

This fraction was easily removed by centrifugation, redissolved in water and the solution filtered through paper and reprecipitated at half saturation.

The precipitate was redissolved in water, transferred to a parchment bag and dialyzed against distilled water until free from the SO_4 ion. A considerable fraction (*A*) separated and was removed by centrifugation. The solution (*B*) from which it had precipitated was dialyzed for 24 hours more and nothing further precipitated.

The precipitate (*A*) was agitated with 200 cc. of 10% salt solution and allowed to stand in the ice chest for several hours. The insoluble part, (*C*), which is an altered protein, was centrifuged off, washed with brine, suspended in water, dialyzed free from chlorine ion, collected by centrifugation, washed with 50% alcohol, 95% alcohol, absolute alcohol, and finally with ether. The yield was 0.68 Gm. equivalent to 0.3%. This is the largest yield of this fraction we ever obtained.

The 10% saline filtrate from (*C*) was dialyzed free from salt. It yielded a precipitate of globulin (*D*) that weighed 0.42 Gm. This fraction is usually larger than this, frequently amounting to 0.85 gram or 0.4%.

Several analyses of this globulin were made:

Sample.	No.	Yield Gm.	Ash %.	C.	H.	N.	S.	P.
166	1	0.72	1.67[1]	52.8	7.3	..	1.1	0.08
166	1	..	..	52.7	7.1	..	..	..
162	a	0.77	1.54[1]	52.7	7.1	..	..	..
158 & 170	mixed[2]	..	1.17[1]	..	..	14.63	..	..
162	*a*	..	..	52.4	6.9	..	..	..

The chief part of the protein precipitated at half saturation has the solubilities of an albumin, and is found in solution (*B*) from which ammonium sulphate has

[1] Ash contained iron.

[2] Molisch test ++.

been removed by dialysis. It is easily removed by coagulation and represents 2.5% of the gland.

Several analyses of this material were made:

Sample.	No.	Yield Gm.	Ash %.	C.	H.	N.	S.	P.
152	1	5.4	0.85	52.0	6.95	..	..	..
152	1	..	..	52.05	7.05	..	..	..
152	1	..	..	52.3	7.0	..	..	..
152	1	..	..	51.95	6.9	..	..	..
162	B	4.66	..	..	..	15.26	1.5	absent
158[1]	B	4.1	0.73	..	..	15.32	1.58	absent

The filtrate from the coagulated albumin when poured into alcohol gave very uniform yields of a mucoid substance, amounting to 0.4%.

Several samples of this uncoagulable protein were analyzed: Molisch test +.

Sample.	No.	Yield.	Ash.	C.	H.	N.	S.	P.
164	..	0.88	1.84	51.1	7.1	..	..	..
..	..	..	..	50.7	7.0	..	..	..
160	1	0.91	3.10	..	..	14.3	1.47	absent
171	..	0.56	8.54	50.7	7.2	..	..	..

The half-saturated ammonium sulphate solution from which the above fractions separated was acidified with acetic acid, maximum precipitation occurring at $p_H = 3.2$. For the original liquid $p_H = 4.6$. This precipitate was suspended in water and dialyzed free from chlorides and sulphates, and there remained as an insoluble protein salt, *E*, 2.0 grams.

Analysis of protein salt *E* resulted as follows:

Sample.	Yield.	Ash.	C.	H.	N.	S.	P.
..	..	..	52.0	7.1	..	..	..
171 P	2.05	0.3	51.9	6.85	14.76	1.75	0.22
167 P[2]	2.85	0.3	..	..	14.64	1.83	0.27

The aqueous fluid which was separated from the above protein salt yielded upon coagulation (in the presence of salt) small yields (approximately 0.1%) of a coagulated protein.

The total protein separated from the water extract of 219 Gm. gland varied from 10.3 Gm. to 8.2 Gm. Since the extract obtained measured about 90% of the three liters used, it may be concluded that the yield amounted to about 4.5 to 5%.

B. The Saline Extract.—When fat-free ovarian residue is directly extracted with 10% saline solution a protein extract of the following composition resulted:

Protein precipitated by acetic acid	3.60%
Protein coagulable in filtrate	6.95
Total nitrogen in filtrate	0.95
Alcohol soluble nitrogen (90% alcohol)	0.75

It is apparent that salt solutions extract a somewhat larger quantity of protein, than does water, indicating the presence of several per cent of globulin.[3] In

[1] Molisch test ++.

[2] Molisch test +++.

[3] A saline extract subsequent to a preliminary water extract yielded 2.6% coagulable protein to 4.3%.

order to isolate this as pure as possible the albumin fraction was removed with an aqueous extract, after which the residue was extracted with 10% salt solution (thymol).

PREPARATION OF PROTEINS FROM SALINE EXTRACT. AFTER PRELIMINARY WATER EXTRACT.

(*a*) Two hundred Gm. fat-free ovarian residue was exhausted with 3 liters of distilled water, and the extracted residue after washing with further quantities of water was extracted with 3 liters of 10% salt solution. The mixture stood in the ice chest over night. The extract was removed by centrifugation and filtered through a diatomaceous filter. The filtrate measured 2870 cc. (p_H = 6.).

To this extract 30 cc. 2 N hydrochloric acid was added and after standing in the ice chest over night a precipitate (205:1) weighing after purification 6.4 Gm. separated. This preparation was purified by suspension in water and dialysis against distilled water until free from Cl^-.

The filtrate (p_H = 3.) was further acidified by addition of 20 cc. 2 N, hydrochloric acid (p_H = 2.). The precipitate weighed 0.45 Gm. (205:2).

The filtrate from the above preparations was heated to coagulation when 0.53 Gm. further resulted (205:3).

The total protein in this extract therefore amounts to 7.38 Gm. equivalent to 3.4% of the original glandular material.

The analyses of these protein preparations gave the following results:

205:1; Moisture, 7.58%; Ash, 1.52%; On ash- and moisture-free basis, S = 0.89%; P = 1.39%.

205:3; Moisture, 8.2%. On moisture-free basis, S = 1.6% and P = 0.06%.

(*b*) A further quantity saline extract was prepared exactly as above, 3 liters of filtered extract being obtained. This extract was 1/4 saturated with ammonium sulphate and after standing over night in the ice chest the precipitate was centrifuged out, suspended in water and dialyzed free from salts and collected in the usual manner. It weighed 2.1 Gm. and was readily soluble in dilute salt solution.

Analysis 210:1; Moisture 12.2%; Ash, not determined.
On moisture-free basis, S = 1.43%; P = 0.34%.

The filtrate from the less soluble globulin was now half saturated with ammonium sulphate. By the same procedure as above mentioned it was found that the protein precipitated at 0.25 to 0.50 saturation weighed 1.28 Gm. To this weight should be added, however, 0.5 Gm. which was obtained by heating the dialyzed fluid in which the precipitate was originally suspended.

Analysis, 210:2; Moisture, 14.7%; Ash, not determined.
On moisture-free basis, S = 1.42%; P = 0.56%.

The filtrate from the material precipitated at half saturation yielded on coagulation 2.2 Gm. further, but this was not examined.

It therefore appears that the preliminary removal of water-soluble proteins, through the removal of phosphorus-free proteins causes the subsequent saline extract to yield rather highly phosphorized products which are unsuitable for analysis by hydrolysis. There is some evidence also that a considerable part of

the protein found in the saline extract may in fact be the same albumin found in the water extract.

Assuming the phosphorus to be present as nucleic acid (8.94% P) the material, 205:1, is probably a combination of nucleic acid (15%) and protein (85%). The corrected sulphur content for the protein moiety is therefore 1.07%.

The protein part of this fraction consists, however, of more than one protein. At 1/4 saturation the material 210:1 consists of 96% protein so that the corrected sulphur content for the protein part of this precipitate is 1.49%. The material precipitated at half saturation, 210:2, on the same basis contains 94% protein with 1.51% S. These two estimations of sulphur indicate that the material precipitated at this particular acidity with ammonium sulphate up to half saturation might consist of the same albumin found in the water extract and which, as shown above, contains 1.5% sulphur.

This identity is also indicated by the fact that when it was purified by dialysis a considerable portion of the suspension dissolved in the water as dialysis proceeded and it could again be separated by coagulation.

C. Direct Saline Extract.—Two hundred grams fat-free tissue (219 Gm. ovarian residue) was shaken with 3 liters of cold 10% sodium chloride solution and allowed to stand in the ice chest over night. The extract was centrifuged and filtered through Mandler filters. The filtrate measured 2850 cc. A test portion (5%) was removed. It showed $p_H = 5.4$. When heated, two coagulation points could be detected. It showed a very slight turbidity at 70° and a dense curdling at 74–75°. After filtering this off, the filtrate remained clear up to 83°, was quite turbid at 88° but for flocculation it was heated at 90° to 95°. If the original extract ($p_H = 5.4$) is slightly acidified with acetic acid, precipitation results. If a solution containing 0.1% acetic acid is centrifuged clear and heated it grows turbid at 55° and flocks at 60°. After filtering this off a second and last coagulum can be produced at 74° to 75°.

The saline extract (2700 cc.) was now dialyzed against distilled water and a globulin fraction precipitated. This was removed, rinsed with water and shaken with 10% salt solution (100, 50, 50 cc.) and the saline extract removed from insoluble material by means of the centrifuge. The *insoluble part* or altered globulin weighed 1.12 Gm.

Analysis, 212; Moisture, 5.32%. On moisture-free basis: S = 1.16%; P = 0.23%.

The clear saline solution from which this altered globulin had separated was dialyzed and 1.27 Gm. of *globulin* resulted. We might add that prolonged dialysis failed to render this precipitation complete, and that 0.22 Gm. was precipitated by the addition of acetic acid to the filtrate from the globulin.

Analysis: 216; Moisture, 7.00%. On moisture- and ash-free basis: P = 0.038%. C = 50.9, 50.15; H = 7.2, 6.95. It therefore is not identical in this respect with the same fraction prepared from the direct water extract.

In order to check up the results previously obtained on the aqueous protein extracts, the original aqueous liquid from which approximately 2.6 Gm. had been removed upon dialysis was divided into two equal parts. The first portion was heated on the steam-bath but failed to coagulate until salt and acetic acid were added. The coagulum removed in the usual manner weighed 4.56 Gm., which

would correspond to 9.6 Gm. from 219 Gm. of tissue; a yield entirely disproportionate to the coagulated albumin found in the aqueous extract and exceeding the weight of all the water-soluble proteins previously found.[1] The product was, however, entirely unsatisfactory, being very dark and had evidently occluded much foreign material.

This filtrate yielded 0.54 Gm. mucoid (S = 1.25%, P = 0.28%).

The other half of the solution was therefore half saturated with ammonium sulphate in substance and allowed to stand in the ice chest. The precipitate was redissolved in water (200 cc.) and reprecipitated with ammonium sulphate.

The reprecipitated protein was redissolved and the solution filtered to remove a small amount of insoluble material. This solution was dialyzed, but nothing separated. The coagulation of this liquid yielded 1.0 gram of coagulated albumin.

The filtrate from the coagulated albumin yielded a small amount (0.07 Gm.) of mucoid.

The albumin 212; 214, on moisture-free basis, S = 1.1; P = 0.015%.

The half-saturated filtrate from which the above had separated gave a maximum precipitation at $p_H = 3$, and at this point (HCl) precipitation was effected. We suspended the precipitate in water and dialyzed it free from sulphates and in this process a considerable part of it dissolved. The entire fraction was therefore coagulated. Weight 1.5 Gm.

The weights obtained by the ammonium sulphate procedure are too low and mucoid fraction is conspicuously absent. The work was repeated. Two hundred and fifty Gm. fat-free ovarian residue, extracted with 3800 cc. saline solution (10%) yielded an extract which when dialyzed gave a globulin precipitate. This precipitate was treated with 10% saline solution. The insoluble part or *altered globulin* weighed 0.75 Gm.

The soluble globulin separated from its saline solution upon dialysis. It weighed 0.9 Gm. and the salt-free filtrate when acidified with acetic acid yielded 0.3 Gm. further.

The dialyzed and porcelain-filtered solution from which these globulins had separated, when coagulated directly again in the presence of salt and acetic acid, gave an unsatisfactory black preparation of coagulated albumin weighing 11.5 Gm. The filtrate from this material after dialysis was concentrated to a small volume and some insoluble material filtered off and the concentrated solution was poured into alcohol and a typical mucoid fraction weighing 2.15 Gm. It should be pointed out that in the immediately preceding experiment practically no mucoid had been obtained, the first coagulum undoubtedly having carried it down.

(*c*) The experiment was repeated a third time. From 250 Gm. of fat-free ovarian residue, we isolated 0.97 Gm. insoluble altered protein and 2.0 Gm. of *globulin*.

Analysis of globulin 220:1; C = 49.9, 49.35, 49.5; H = 6.8, 6.8, 6.8.

The dialyzed solution from which the globulin fraction had separated was now half saturated with ammonium sulphate. The precipitate was redissolved in

[1] A typical experiment on the aqueous extract would yield, after dialysis, approximately 5.4 Gm. of coagulated albumin, 0.8 Gm. mucoid, 2.0 Gm. of protein salt precipitated with acid, 0.2 Gm. of coagulum in the filtrate from the protein salt; a total of 8.4 Gm.

750 cc. water and again precipitated at half saturation. The precipitate was dissolved in water and the solution filtered through porcelain and dialyzed until free from sulphates. The slight turbidity always observed at this step amounted in this case to a definite precipitation, which was removed by vigorous centrifugation. This material represents an alteration product (of globulin-like nature) which has resulted from the main protein which has always shown albumin-like properties. This precipitate was entirely soluble in salt solution and could be almost entirely reprecipitated upon dialysis. The material thus isolated weighed 0.65 Gm. and we will compare it critically with the globulin fraction. It is to be noted that the globulin yield (2.0 Gm. obtained) is already higher than usually obtained. In this particular experiment the saline extract stood over Sunday in the ice chest instead of being worked up within 12 hours.

The dialyzed solution from which the globulin-like artifact had been removed was coagulated and the albumin fraction amounted to 4.5 Gm.

This material agreed with the albumin previously isolated from the aqueous extract.

Analysis, 221:1. On moisture- and ash-free basis; C = 52.25; H = 6.9.

The filtrate from this coagulum was concentrated to 200 cc. and salt added (20 Gm.) and upon acidification with acetic acid a small amount (0.13 Gm.) further separated. The solution was freed from salt by dialysis, evaporated to a small volume and poured into alcohol. Weight 0.45 Gm.

Analysis, 222:3; Ash = 7.71%. On ash- and moisture-free basis; C = 47.8; H = 6.95. Molisch Test ++.

The solution from which the proteins had been removed by half saturation with ammonium sulphate was now completely saturated and a heavy precipitate removed by means of the centrifuge. It was redissolved in water and upon dialyzing this solution a slight amount of a globulin-like alteration product again separated. Most of the protein dissolved, however, and it was recovered by coagulation. Weight 1.55 Gm.

Analysis, 221:2. On moisture- and ash-free basis; C = 51.1; H = 7.0.

The filtrate from 221:2 was concentrated on the steam-bath. To a test portion was added some sodium chloride and acetic acid, but no coagulation occurred. The main portion was precipitated with alcohol yielding 3.26 Gm. of material which has not been investigated.

D. Alkaline Extractions.—Residues from the glandular material which had been extracted with ether, water, and 10% salt solution, were shaken with water and several aliquots equivalent to 20 Gm. of the ether extracted gland (21.9 Gm. gland). To these suspensions enough 10% NaOH solution was added to make the concentration of alkali 0.1, 0.2, 0.3, 0.5 and 1.0 per cent respectively. The volume of extracting material is 500 cc. in each case. The extractions were repeated three times. The extracts were acidified with acetic acid, separated, dried and weighed in the usual manner. The yields were as follows: 0.1% = 10.3%;[1] 0.2% = 16.3%; 0.3% = 14.9%; 0.5% = 22.5% and 1.0% = 22.9%.

[1] Moisture = 10%; Ash- and Moisture-free basis, S = 1.13%; P = 0.63%.

It is therefore apparent that when this residue, consisting no doubt largely of connective tissue, is extracted with 1.0% sodium hydroxide, that approximately half of the extract consists of mucoid (?) material readily soluble in 0.1% alkali, while the remainder consists perhaps of protein which is liberated by the action of the stronger alkali, perhaps from chondroitin acid combination.

E. Hydrolysis of the Ovarian Residue Albumin.—It is perfectly obvious from the foregoing that the chief soluble protein in ovarian residue consists of water-soluble protein, also soluble in saline solution, not precipitated by dialysis and precipitated at half saturation with ammonium sulphate. It can be prepared phosphorus free and has a sulphur content of 1.5%. (C = 51.9, H = 7.0.)

The material was examined by the Van Slyke process: 3.0181 Gm. (162B, containing 5.46% moisture and 0.16% ash) of ash- and moisture-free protein was hydrolyzed with 20% hydrochloric acid and hydrolysis was found to be complete after 24 hours. (Amino N = 13.37, 13.38%.)

Total N = 15.28, 15.37, 15.23, 15.15; average = 15.26%.

The results may be tabulated as follows:

	Per cent of protein.	Per cent of N.
Total N	15.26	100.00
Amide N	1.19	7.80
Humin N	0.22	1.44
Cystine N	0.11	0.70
Arginine N	1.77	11.60
Histidine N	0.03	0.20
Lysine N	2.27	14.69
Mono Amino N	9.24	60.55
Non Amino N	0.47	3.08
		99.43

This protein contains 8.5% tyrosine[1] and 2.1 to 2.27 of tryptophane.[2]

F. Hydrolysis of the Acid Precipitated Protein from Ovarian Residue.—In the foregoing discussion of the preparation of proteins it will bave been observed that after the above-described albumin has been precipitated at half saturation with ammonium sulphate, there remains in the original extract a considerable amount of protein. This can be precipitated by the addition of acid. According to the current methods described by Abderhalden, half saturation with ammonium sulphate is a routine procedure for separating albumins from globulins. It is customary to designate the material more readily precipitated as a globuliin, while complete saturation is required to precipitate the albumin. In this case, however, the material precipitated at half saturation has many albumin-like properties.

Now the material precipitated by acidification of the half-saturated solution shows a composition almost identical with the albumin. (See analysis of 171 P.) However, when precipitated as a salt it does not dissolve when dialyzed against distilled water.

In order to establish whether or not this preparation differed from the albumin, it also was hydrolyzed.

The material was examined by the Van Slyke process. 3.2687 grams (171 P + 173 P containing 6.08% moisture and 0.82% ash) of ash- and moisture-free

[1] Folin and Looney, *J. Biol. Chem.*, 51, 421 (1922).

[2] May and Rose, *Ibid.*, 54, 213 (1922).

protein was hydrolyzed for 25 hours with 20% hydrochloric acid. (Amino N = 12.8%.)

	Per cent of protein.	Per cent of N.
Total N	14.76	100.00
Amide N	1.35	9.14
Humin N	0.38	2.55
Cystine N[1]	0.10	0.69
Arginine N[1]	1.70	11.52
Histidine N[1]	0.00	0.00
Lysine N[1]	2.30	15.58
Mono Amino N	8.43	57.11
Non Amino N	0.55 (0.50)	3.41
		100.00

	Albumin.	Acid precipitated protein.
Arginine N	1.77	1.70
Total N	4.15	4.10
Amino N	2.80	2.94

These proteins are remarkably alike in their content of hexone bases. Recalculating these agreeing results they are found to have the following composition:

	Per cent of protein.
Arginine	5.5
Histidine	0.10 or less
Lysine	11.8

There is, however, a distinct difference in the mono amino acid composition of the filtrate as will be observed by noting 9.24% found in the case of the albumin, whereas the acid precipitated protein yields only 8.43% and we have rigorously determined this by comparative analysis.

By colorimetric methods we found for this protein; tyrosine = 7.1% and tryptophane = 1.88 to 2.07%.

Since little confidence can be placed in the identity of the other fractions such as mucoid, they have not been hydrolyzed.

SUMMARY.

The water- and saline-soluble proteins of ovarian residue, that is of the gland from which corpus luteum has been removed, amounting to 10 to 11% of the desiccated tissue consists largely of an albumin for which C = 52.0; H = 7.0; N = 15.3; S = 1.5%.

The structural formula may be approximated as follows: $Arginine_3$, $Lysine_7$, $Tyrosine_4$, $Tryptophane_1$, $Cystine_2$, Mono amino $acids_{56}$. M Wt. = 8500.

KALAMAZOO, MICHIGAN,
NOVEMBER 10, 1925.

[1] The base fraction gave results agreeing with those found for the albumin. In the base fraction we have:

STUDIES IN THE GENUS MENTHA.

IX. THE REDUCTION OF *d*-PULEGONE BY PALLADIUM AND HYDROGEN.[1]

BY G. C. JENISON[2] AND R. E. KREMERS.[3]

As will be elucidated in a subsequent paper, the occurrence of menthenones in the oils of the Genus *Mentha* has been made the basis for a working hypothesis concerning genetic relationships in the formation of certain compounds. These speculations involve the reduction of a menthenone, $C_{10}H_{16}O$, to a saturated ketone, $C_{10}H_{18}O$. Since *d*-pulegone is the quantitatively important isomer according to our present knowledge of these oils, an understanding of its behavior on reduction is very desirable.

Inasmuch as catalytic reductions at room temperature have at least certain superficial analogies to biochemical processes, attention was turned to this type of reaction. Skita[4] has reduced *d*-pulegone by the Pt-H catalyst under 2 atmospheres pressure and has reported *d*-menthol as the product. Since the reduction of *d*-pulegone by the Pd-H catalyst appeared not to have been reported, to undertake it was a logical development. Our initial experiments were performed as follows.

The hydrogen used was withdrawn from a commercial bomb and led into a gasometer under little more than atmospheric pressure. Before passing into the reaction mixture, it was washed through bottles containing respectively alkaline pyrogallol, alkaline permanganate, distilled water, and sulphuric acid. The bottle serving as reaction chamber was fitted with a twice-bored rubber stopper which carried the inlet tube and a stop cock to permit displacement of air.

The proportions of the reaction mixture were taken as follows: 0.2 Gm. of palladium recently converted into the chloride was dissolved in 5 mls. of water; there were added 0.5 ml. of 10 per cent gum arabic solution and of 0.5 *N* sodium hydroxide a quantity equivalent to the chlorine present. Finally 10 mls. of pulegone dissolved in 10 mls. of 95 per cent ethanol were introduced. After the air had been displaced, the reaction mixture was shaken mechanically until hydrogen was no longer appreciably absorbed. This interval was usually about 30 hours.

At the completion of the reaction the oil and catalyst were best separated by steam distillation. Of 113 mls. of pulegone reduced in varying amounts, 83 mls. were recovered from the aqueous distillate. This oil was treated according to the assay technique with sodium sulphite to free it from pulegone, again steam distilled, and finally dried over anhydrous sodium sulfate. The resultant oil measured 64 mls.

$$d_{22^\circ} = 0.9002; \qquad n_{22} = 1.4601; \qquad \alpha = +21.19^\circ$$

Ester number after acetylization = 33.6, corresponding to 9.6 per cent menthol. The oil was twice fractionated.

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[1] Contribution from the Wisconsin Pharmaceutical Experiment Station, Madison.

[2] Fritzsche Brothers Fellow.

[3] National Research Council Fellow in Chemistry, 1922–1923.

[4] Skita, *Ber.*, 48, 1496 (1915).

Frac.	B. p.	d_{25}	n_{25}	Vol.	α_{D25}
1	200–05°	0.8936	1.4535	8.8 ml.	....
2	205–10	0.9020	1.456	30.0	+21.15°
3	210–15	0.8975	1.461	7.0	....
4	215–22	0.9204	1.4701	4.4	....
5	222+	residue			

Ten mils of fraction 2 were converted into the semicarbazone. The reaction product was resolved into two fractions. The higher melting fraction showed a melting point of 183–84° C.; mixed with *l*-menthone semicarbazone the result was m. p. 183° C.; 0.5 g. of the semicarbazone dissolved in 100 mls. of absolute ethanol showed $\alpha = -0.25°$ in a 10 cm. tube, whence $[\alpha]_D = -50°$.

Three grams of the semicarbazone were mixed with 10 Gm. of oxalic acid and distilled by steam. The regenerated ketone was separated mechanically from the aqueous distillate. One Gm. in 10 mls. of 95 per cent ethanol showed $\alpha = -0.67°$ in a 10-cm. tube, whence $[\alpha]_D = -6.7°$.

The regenerated ketone was reconverted into its semicarbazone, m. p. 184°, thus proving that isomerization had not occurred during hydrolysis.

The lower melting fraction of the original semicarbazone showed a melting point of 99° C. One Gm. dissolved in 20 mls. of chloroform showed $\alpha_D = +1.57°$ in a 10-cm. tube, whence $[\alpha]_D = +31.4°$. The ketone was regenerated in the same manner as the preceding. One Gm. in 10 mls. of 95 per cent ethanol showed $\alpha_D = +2.57°$, whence $[\alpha]_D = +25.7°$.

The semicarbazone obtained from the regenerated ketone melted at 175–176° C.

Fraction 3 was examined for menthol by means of phenyl-isocyanate in the usual manner. Crystals separated slowly and were filtered out at the end of three days. They proved to be diphenylurea, m. p. 234° C.

SUMMARY.

d-Pulegone obtained from the oil of the "Japanese Peppermint" grown at the Wisconsin Pharmaceutical Experiment Station was reduced by palladium and hydrogen. The reaction product consisted essentially of saturated ketonic material. The semicarbazone prepared therefrom yielded a levo-rotatory fraction similar to *l*-methone and a dextro-rotatory fraction which was not identified. No positive evidence of the presence of menthol was obtained.

EXTRACTION OF ALKALOIDS FROM ANIMAL MATTER.

For the extraction of alkaloids and other organic compounds from viscera or other animal organs, R. Fabre suggests submitting the tissues to the action of pancreatin. The organs are pulped and then mixed with 5 parts of water; the mixture is heated to boiling, and on cooling to 50–55°, it is transferred to a wide-mouthed flask, adding 1 gram of pancreatin for every 50 grams of pulp. The flask is maintained for 10 to 12 hours at a temperature of 50–55°, at the end of which the proteolytic action is complete. The contents of the flask are now heated to boiling and filtered; the resulting clear liquid is then treated with the usual solvents to extract the alkaloid. The author found that by this method strychnine, narcotine, veronal, and sulphonal are not altered by pancreatin.—R. Fabre in *Répertoire de Pharmacie*, August 10, 1925; through *Chemist & Druggist*.

BERBERINE IN THE COMMON BARBERRY (BERBERIS VULGARIS L.).*

BY E. R. SCHULZ.[1]

The paper gives a historical review of studies on the isolation, chemistry, and uses in medicine of berberine and contains a detailed bibliography on the subject. It also contains results of an investigation on the precipitation of berberine as crystalline berberine acetone.

INTRODUCTION.

The barberry plant that spreads the black stem rust to cereals and grasses required considerable study before adequate means of eradication were found. Investigations on the optimum soil conditions, the habitat and the metabolism of the plant were begun before field experiments proved common salt and kerosene to be satisfactory means of eradication. The results of these investigations are of interest not only in further helping to solve the problem of getting rid of the harmful common barberry, but also in adding to the knowledge of plants. In this paper are reported the results of an investigation of the alkaloids, particularly berberine, in the barberry.

It has been reported in the literature that salts of this alkaloid have great influence upon animal and plant life. One-half per cent of berberine hydrochloride (34)[3] checked the growth of *Bacterium coli*, stopped formation of indol and volatile fatty acids in protein decomposition, and acted as a strong poison to rabbits, frogs, hens and mice, causing leucocytosis and nephritis and affecting the nervous system. One per cent of berberine hydrochloride stopped the germination and development of the spores of mucor; and 1/222 mol. (55) in 1 liter of water materially reduced the energy of germination of peas, wheat and rape. When this strength of solution was applied to the seedlings, growth was stopped. It has also been reported in connection with these experiments that partial neutralization of the effects of berberine was effected when 0.2 per cent of tannin solution had been applied to the plants treated with berberine hydrochloride solution.

The above-mentioned influences of berberine on plants suggests that better knowledge of the alkaloids and other little-known ingredients of the barberry might indicate a procedure in attacking the problem of immunity and susceptibility, such as exists in the case of the Japanese and the common barberries in relation to *Puccinia graminis*, the organism causing stem rust. With this point in mind, the following information is presented.

HISTORICAL REVIEW.

The yellow, bitter substance present in the barberry plant was known in the arts of medicine long before the chemists had a knowledge of the properties and the

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* Read before Scientific Section A. PH. A., Des Moines meeting, 1926.

[1] Agent, Office of Cereal Investigations, Bureau of Plant Industry, U. S. Department of Agriculture.[2]

[2] This investigation was carried on in the laboratory of Dr. E. Kremers, Department of Pharmacy, University of Wisconsin. The writer is grateful to Dr. Kremers for many courtesies and many helpful suggestions.

[3] Numerals in parentheses refer to papers in the "Bibliography" at end of paper.

chemistry of this substance. One finds in the literature on the subject that since the year 600 B. C. and extending to modern times, decoctions from the berries, bark and roots have been used as detersive agents, astringent stomachiques, febrifuges and cures for venereal maladies. Occasionally the extracts were used also as dyes.

Isolation of Crystalline Berberine.

Not until the beginning of modern chemistry and the discovery by Sertürner in 1918 of the so-called alkaloids in plants, was the yellow substance in the barberry studied intensively. This discovery created a new outlook and stimulus, and attracted a number of investigators to the study of this interesting and complicated substance. As a result, we have at the present time satisfactory methods of extraction and rather definite knowledge of the chemistry of this substance.

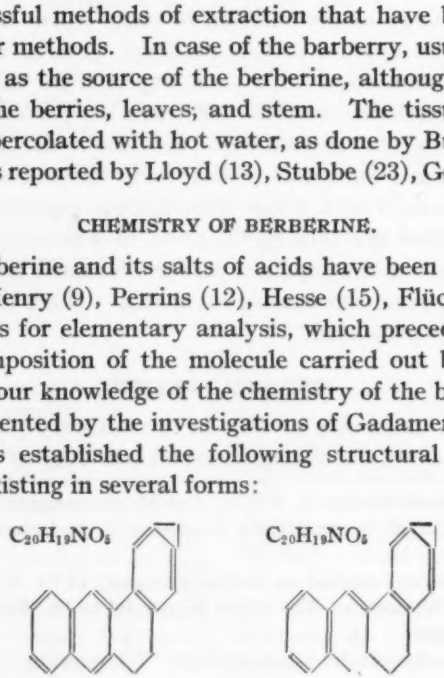
The first report on the isolation of the yellow alkaloid berberine from the root of the common barberry was published by Brandes (1) in 1825. He obtained it in an amorphous form of intense yellow color and was able to prepare from it derivatives with acids. The following year, 1826, Chevallier and Pelletan (2) for the first time obtained the substance in a crystalline form from the prickly ash (*Xanthoxylum clava-herculis*) and named it xanthopicrit. Buchner and Herberger (3), in 1830, obtained the same crystalline substance from the root of the barberry and they were the first to name it berberine. This name has been retained for the alkaloid by all subsequent investigators, although it is now known that this alkaloid is rather widely distributed in the plant kingdom and occurs not only in the Berberidaceae family, but in the Ranunculaceae, Papaveraceae and Rutaceae as well.

METHODS OF EXTRACTION IN USE.

The most successful methods of extraction that have been used are the hot-alcohol and hot-water methods. In case of the barberry, usually the bark and the roots have been used as the source of the berberine, although small amounts have been found also in the berries, leaves, and stem. The tissues are ground before extraction and then percolated with hot water, as done by Buchner (4) and others, or with hot alcohol, as reported by Lloyd (13), Stubbe (23), Gordin (27), and others.

CHEMISTRY OF BERBERINE.

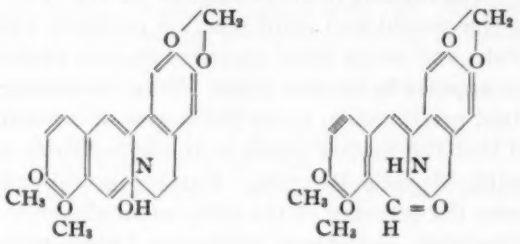
The isolated berberine and its salts of acids have been used by Schmidt (17, 18), Fleitmann (5), Henry (9), Perrins (12), Hesse (15), Flückiger (16), Gaze (19), Rüdel (24) and others for elementary analysis, which preceded the investigations of the structural composition of the molecule carried out by W. H. Perkin, Jr. (20, 22, 44) to whom our knowledge of the chemistry of the berberine is due. The latter's work supplemented by the investigations of Gadamer (35, 38), Faltis (41), and Tinkler (49) has established the following structural configuration of the molecule capable of existing in several forms:



Tinkler (49) has suggested that the aldehyde form exists as carbinol instead of an aldehyde, and it is agreed that the ammonium form is known only in solutions and not in solid state.

SYNTHESIS.

The synthetic preparation of tetrahydroberberine and oxyberberine by Pictet and Gams (46, 47) and of berberine by Haworth *et al.* (63), Buck *et al.* (62), and of oxyberberine by Perkin *et al.* (64) leave no doubt in the minds of most of the investigators as to the correctness of the above formulas in their major parts.



EXPERIMENTATION.

Extraction.

The hot alcohol method proved to be a good method for getting out the alkaloids of the barberry. Finely ground roots were extracted with hot alcohol until most of the color had disappeared from the drug. The residue was further extracted with hot water for long periods, but the water extract gave only traces of alkaloid, showing the alcohol to be an efficient extraction medium.

Preparation of Berberine Acetone.

The preparation of berberine acetone has been reported by Schmidt (18), Schreiber, and Gaze (19). According to Gordin (27, 32, 36), the isolation of berberine as berberine acetone seemed to give the best results. As details for obtaining the best yields were wanting, it was desirable to ascertain what degree of concentration of the alcoholic tincture and what amounts of acetone caused the best precipitation.

Small amounts of ground barberry roots were used to begin with. Three hundred grams were placed in a percolator and extracted successively with 3000 cc. of hot alcohol until most of the yellow color had disappeared from the drug. The alcohol was recovered by distillation from a water-bath until about 300 cc. of extract remained. The alcoholic distillate had a very striking odor. The residue was diluted with water to 1500 cc. The aqueous filtrate from the resinous precipitate resulting was made alkaline with 50 cc. of 10 per cent aqueous NaOH solution. The alkaline solution was warmed to 60° C., divided into three equal portions and 100 cc., 200 cc. and 300 cc. of acetone added, respectively. The crystalline precipitate of berberine acetone, which began to come down soon after cooling, was filtered off, dried at room temperature and weighed. The respective yields were 0.998 Gm., 0.958 Gm. and 0.860 Gm., or an average of 0.93 per cent of berberine acetone, corresponding to 0.77 per cent of berberine.

The experiment was repeated on a larger scale with 900 Gm. of the drug and 5 liters of alcohol. The alcoholic tincture was evaporated to 200 cc. and the ex-

tract subsequently diluted with water to 900 cc. To the filtrate, rendered alkaline and divided into three equal parts, 75 cc., 100 cc., and 200 cc., respectively, of acetone were added. The berberine acetone was separately dried and weighed as before. The respective weights were 3.529 Gm., 3.559 Gm., and 3.552 Gm. The addition of another 100 cc. of acetone to each respective mixture caused a further precipitation in the first but not in the second and third. This second precipitation was much purer and brought the total precipitate up to 4.594 Gm. Hence, the average yield was 1.3 per cent of berberine acetone, corresponding to 1.07 per cent of berberine. The melting point was at 165° to 175° C.

Inasmuch as the second and third reaction mixtures yielded about the same weight of precipitate, and as the third appeared slightly purer than the second, the correct conclusion appears to be that about 150 cc. of acetone may be expected to bring about the best precipitation under the degree of concentration used.

It was found that the mother liquor from the berberine acetone gave a strong alkaloidal test with Mayer's Reagent. Further investigations might have revealed in this liquor the presence of the companion alkaloids of berberine such as, berbamine, oxyacanthine, and others, which are known to be present in the barberry plant (see Stubbe, 23).

Preparation of Salts of Berberine.

Definite amounts of berberine acetone were mixed with water and heated over a water-bath, and calculated amounts of dilute acids were added in excess to replace the acetone in the berberine molecule. The addition of the acids to the berberine acetone in hot water caused the berberine acetone to dissolve. On cooling the acid salts precipitated. Hydrochloric acid formed beautiful yellow, silky crystals; nitric acid produced orange crystals; phosphoric, oxalic and salicylic acids formed yellow crystals.

Preparation of Pure Berberine.

Berberine sulphate was used for the preparation of pure berberine of the Gadamer (35, 38) aldehyde form. To the berberine sulphate was added enough $Ba(OH)_2$ to take care of the sulphate in the berberine molecule. After filtering off the solution, an excess of NaOH was added, when a light-colored precipitate formed. The precipitate was dissolved in ether and allowed to crystallize. The crystals were at first of light yellow color but on standing turned dark brown. They melted at 144° C.

SUMMARY.

The salts of the alkaloid berberine have been found to exert considerable influence on the physiological functions of plants and animals. This alkaloid has been used in medicine since before 600 B. C. and is still used to some extent.

Our knowledge of the chemistry of alkaloids dates from 1817, and berberine was first isolated in a pure form in 1826 from *Xanthoxylum*. In 1830, it was isolated from *Berberis* and named berberine. It has since been found that the same alkaloid occurs in several plant families.

Berberine is readily extracted from the ground plant tissue by hot water or hot alcohol. Its chemical formula is generally given as $C_{20}H_{19}NO_5$. It has been successfully synthesized in the laboratory.

Experiments reported in this paper showed almost complete extraction with hot alcohol. The addition of acetone to the extract precipitated the crystalline berberine acetone, giving yields as high as 1.3 per cent of the berberine acetone which is equivalent to 1.07 per cent of berberine.

Other crystalline salts were obtained readily by the addition of various acids to the hot berberine acetone water solution. Pure berberine in the form of light yellow crystals was prepared from berberine sulphate.

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A SIMPLE VISCOMETER FOR ABSOLUTE MEASUREMENTS.*

BY E. MONESS AND P. M. GIESY.

The laws of flow of liquids through capillaries have been worked out by Poiseuille and the formula as given by Bingham[1] is: $\eta = \frac{\pi g p R^4 t}{8 V l} - \frac{m \rho V}{8 \pi l t}$ where η is the viscosity, V the volume of flow in the time t, l and R respectively the length and radius of the capillary, g the acceleration of gravity, p the pressure in grams per sq. cm., ρ the density of the liquid and m a constant equal to 1.12.

Many of the viscometers used in industry, among these being the Saybolt, are based on simply allowing a definite quantity of liquid to flow from a standard container through a standard opening, the assumption being that the time of efflux of the liquid is a measure of its viscosity. The opening is usually a short tube to which the laws of flow above stated are not applicable, and the flow is allowed to take place by gravity thus giving a variable pressure as the flow proceeds. Such measurements are not capable of giving even relative viscosities of liquids, since the time of flow depends not only on the viscosity but also on the density of the liquid. If we wish to get absolute values for viscosity, the measurement must be made under conditions which yield data susceptible to mathematical treatment, according to the laws for the flow of liquids.

We have designed a rather simple viscometer[2] in which the liquid is allowed to flow through a capillary of known dimensions, and in which the pressure is kept constant throughout the run due to a constant hydrostatic head.

Figure 1 shows its construction. An inverted 8 L. bottle from which the bottom has been cut is used as the water-bath. A tube about 1 inch in diameter and about 10 inches long serves as the container for the viscous liquid. The upper end of the tube is closed by a rubber stopper through which passes an air tube, while the lower end is similarly closed by a rubber stopper through which passes the capillary, ending flush with the surface of the stopper. The lower end of the capillary passes through the rubber stopper closing the neck of the water-bath, and protrudes only about 2 mm. beyond the stopper. The air-tube has a piece of rubber tubing attached to the upper end, closed by means of a pinch cock.

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* Read before Scientific Section A. PH. A., Des Moines meeting, 1926.

[1] "Fluidity and Plasticity," p. 18 (1922).

[2] Allen (*J. Soc. Chem. Ind.*, 1886, 131) and Schmid (*Chem.-Ztg.*, 1885, 1514) had designed viscometers in which flow took place under a constant head, but neither used a capillary tube for the flow, this taking place in Allen's viscometer from an orifice, and in Schmid's through a tube.

The container is filled about three-quarters with the viscous liquid and closed with the rubber stopper. By opening the pinch cock for a moment the capillary is filled with the liquid and the air-tube with air. The temperature is next adjusted to the desired point, a 60-cc. receiving flask such as is used with the Saybolt viscometer is placed under the opening of the capillary, and the pinch cock is opened. At this moment the time is taken, air enters from the air-tube and the liquid flows through the capillary into the receiving vessel. As long as the viscous liquid has not reached the bottom of the air-tube the flow takes place under a constant head, and, of course, enough liquid must be present to fill the receiving vessel before this occurs. The time is again taken when the receiving vessel is filled to the mark. It will be seen that all the necessary data for the calculation of the viscosity according to the formula mentioned above are thus obtained.

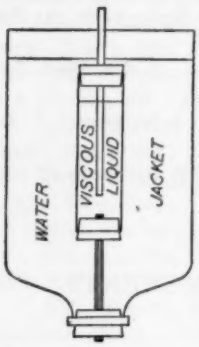

Fig. 1. Viscometer.

That the apparatus works in accordance with the formula will be evident from the following calibrations:

A run was made at 0° C. with a 37% by weight mixture of alcohol and water, which has a fluidity of 13.9 rhes. The distance between the upper end of the capillary and the lower end of the air-tube was 3.8 cm., the length of the capillary was 16.8 cm., and the temperature 0° C. The time was found to be 321 seconds for a volume of 60 cc.

Substituting in Bingham's equation the values:

$\eta = 1/13.9$	$p = (3.8 + 16.8)\ 0.9452$	$l = 16.8$
$\rho = 0.9452$	$t = 321$	$m = 1.12$
$g = 980$	$V = 60$	

we obtain for R, 0.742 mm.

A check calibration by weighing the mercury thread gave 0.745 mm. The former value is of course to be preferred, since it takes in all variations of the capillary from a true cylinder.

That the viscometer gives consistent results is seen from the following:

With a distance between the upper end of the capillary and the end of the air-tube = 3 inches, the length of the capillary = 18 cm., the diameter = 1.817 mm., and the temperature 100° F., two check runs made with liquid petrolatum gave results of 969 and 972 seconds for 60 cc.

Under the same conditions, except that the temperature was kept at 0° C., two runs on a 37% by weight mixture of alcohol and water gave results of 133 and 134 seconds.

SUMMARY.

A viscometer is described which is cheap, easily constructed, and sound in principle, and which will give absolute results for viscosity.

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A SIMPLE METHOD OF DEMONSTRATING COLLOIDAL PARTICLES.*

BY GEORGE H. NEEDHAM.

As more chemists should have the opportunity of examining colloidal particles under the microscope, and as the study of these particles is becoming more and more important, a simple method of demonstrating the coarser colloidal particles with the Abbe condenser universally supplied with microscopes should be of practical value. The following method is offered:

APPARATUS.

(*a*) Compound microscope with a 4-mm. objective and a × 20 compensating eyepiece, giving a magnification of about × 800.

(*b*) A black stop of cardboard or metal used in the stop carrier of the Abbe condenser, 22 mm. in diameter. The size may have to be varied to suit the numerical aperture of the objective and the diameter of the back condenser lens. The shape of the stop is shown in Fig. 1, the dimensions given being those found suitable for a Zeiss-Abbe condenser, three-lens type, and Zeiss 4-mm. DD objective.

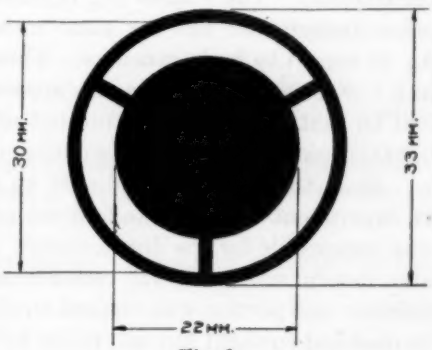

Fig. 1.

(*c*) A Davis Shutter (iris diaphragm) fitted between the objective and nosepiece so as to reduce the numerical aperture of the 4-mm. objective to a point where the sharpest contrast exists between the particles and the dark field. This shutter is not absolutely essential, but it greatly helps in securing a jet black field. As a substitute, instead of having the iris diaphragm of the condenser wide open, it can be closed slightly, but this has the disadvantage of cutting off the light rays of greatest obliquity.

(*d*) A 200-watt concentrated filament Mazda lamp was used. An arc lamp would be better, as the more powerful the source of light, the smaller the particles that can be made visible.

The Abbe condenser must be in immersion contact with the glass slide with a layer of cedar wood oil. The slide used should be a specially selected one as free as possible from flaws and unevenness. The colloidal solution examined should not be more than 1% strength, in a very thin layer between the cover glass and slide, and free from air bubbles.

The several colloidal solutions tried contained particles as small as 100 $\mu\mu$. This method has been found adequate to show the Zsigmondy-Brownian movement, and its simplicity should make it easy to demonstrate this phenomenon in classroom work.

RESEARCH LABORATORIES,
E. R. SQUIBB & SONS,
BROOKLYN, N. Y.

* Read before Scientific Section A. PH. A., Des Moines meeting, 1925.

THE LIGHT-SENSITIVENESS OF BISMUTH SUBCARBONATE.*

BY M. W. TAPLEY AND P. M. GIESY.

The usual bismuth subcarbonate on the market is slightly yellow in color or readily becomes so when exposed to light. Since no trace of a yellow cast is present in the freshly precipitated product, it was decided to investigate the cause of this color change.

In a cursory study of the literature it was noted that in all cases where light-sensitiveness was reported, silver was found to be present. This led to the determination of the silver content in the subcarbonate marketed by this company, using the electrometric method described in a previous paper from this laboratory.[1] This method consists in measuring the silver-ion concentration by determining the potential of a silver electrode immersed in the silver solution, using a saturated KCl-calomel half cell as the reference electrode, and then calculating the p_{Ag} of the solution. The symbol p_{Ag} represents the negative logarithm of the silver-ion concentration and has the same meaning in connection with silver ions as has p_H in regard to hydrogen ions. These potentiometric measurements showed that in a 1:20 suspension of the subcarbonate silver was present in an amount equivalent to that present in a saturated solution of silver iodide, or in the vicinity of 0.000035 part in 100 parts of solution at 21° C.

Since this result showed only an infinitesimal amount of silver to be present, an experiment was made to find out whether the sulphide contamination of the air was responsible for the discoloration. At the same time the effect of sunlight was also determined. Several commercial products were obtained and treated as follows: one portion was exposed to air but kept in the dark; a second was exposed to modified sunlight but not to air by being placed in a Pyrex desiccator behind a glass window; a third was exposed to sunlight which had passed through a glass window, and air. The sample exposed to both air and sunlight had a pronounced yellowish brown tinge.

The fact that no color change had taken place in the sample exposed to sunlight but kept in the Pyrex desiccator, indicated that light of short wave lengths, which is absorbed by glass, is responsible for the color change occurring in bismuth subcarbonate. To confirm this, portions of each sample were exposed to sunlight directly and also when enclosed in flint, amber, and blue bottles respectively. A brownish coloration developed in each case except in the samples enclosed in amber bottles.

EXPERIMENTAL PART.

The concentration chain used in the work was made up as follows:

$$Hg \mid HgCl, \text{Satd. KCl} \mid N\ KNO_3 \mid Ag\ \text{Soln.} \mid Ag$$

The potential measurements were made with a Leeds and Northrup portable potentiometer, at room temperature.

In carrying out the determination, ten grams of bismuth subcarbonate were suspended in 200 cc. of water and 1 cc. of 4% nitric acid was added. After five

* Read before Scientific Section A. PH. A., Des Moines meeting, 1926.

[1] Smith and Giesy, JOUR. A. PH. A., 14, 10 (1925).

minutes a constant reading was obtained. Two cc. more acid was added with no change in the reading taking place. The acidity of the solution was insufficient to dissolve the subcarbonate. This mixture gave an initial voltage reading of 0.0752, the silver electrode being positive.

Using the value 0.497 volt, obtained by Smith and Giesy,[1] for the potential difference between a silver electrode in a solution which is normal with respect to silver-ions and a saturated KCl-calomel half cell, the p_{Ag} of the bismuth subcarbonate mixture was 8.2. This is equivalent to the amount of silver present in a saturated solution of silver iodide, or in the vicinity of 0.000035 part in 100 parts of solution at 21° C.

In another experiment 50 Gm. of bismuth subcarbonate was extracted with aqueous ammonia. After boiling off the ammonia, the solution was tested as above. No evidence of the presence of silver was obtained.

In determining the action of air and sunlight on the subcarbonate the following work was carried out:

Sample no.	Time.	Treatment.	Results.
1	12 hrs.	Enclosed in pyrex desiccator and exposed to sunlight	No change
2	48 hrs.	Exposed to air but not to sunlight	No change
3	12 hrs. Sun 48 hrs. Air	Exposed to both air and sunlight	Brownish coloration
4	15 hrs.	Enclosed in flint bottle and exposed to sunlight	Brownish coloration
5	15 hrs.	Enclosed in blue bottle and exposed to sunlight	Brownish coloration
6	15 hrs.	Enclosed in amber bottle and exposed to sunlight	No change

We desire to express our thanks to Mr. Benjamin Stadholz for assistance in the experimental work.

SUMMARY.

Bismuth subcarbonate develops a brownish coloration when exposed to sunlight. This is apparently a characteristic of the compound itself and not due to impurities either in the atmosphere or contaminating the product. The most effective means of overcoming this difficulty is to market the material in amber bottles or suitable paper cartons.

LABORATORIES OF
E. R. SQUIBB & SONS,
BROOKLYN, N. Y.

GRUBSTAKING LICORICE DIGGERS IN CHINA.

The chief licorice-producing area in China is the Ordos territory, a steppe lying to the north of Shen-Si Province, formerly belonging to Inner Mongolia. The licorice export business of this region is almost monopolized by the merchants of Paote.

Licorice root is gathered by a class of diggers who offer their services for hire to the Paote merchants. Every spring Paote merchants establish their headquarters at Ho-kau and other points near the Ordos territory. From their headquarters collecting agencies are maintained in different parts of the desert. To these agencies licorice diggers report themselves for work.

When a digger is enrolled by a licorice-collecting agency he is given provisions to last several months and also the loan of digging implements, but no wages. He then sets out for the wilderness to search for the plant. On his return he sells his finds to the collecting agency. The digger is bound by contract to sell the plant to no person but the collector from whom he has obtained provisions and the loan of digging implements.—*Chinese Economic Bulletin.*

DEPARTMENT OF BUSINESS MANAGEMENT

Conducted by Paul C. Olsen.*

OUR ADVERTISING POLICY.

BY H. A. B. DUNNING.**

FIVE FUNDAMENTALS OF THIS ADVERTISING POLICY.

1. Service and research for the physician and without thought of immediate profit.
2. A prominent, convenient location.
3. Attractive business quarters.
4. Detailing of physicians in person and by mail.
5. Professional and trade journal advertising.

℞ Salol, 3½ grains
Oleoresin Cubeb, 5 minims
Copaiba, 10 minims
Pepsin, pure, 1–3000, 1 grain
Make one capsule. Send 30 such doses.
Sig. One as directed.

We deliberately encourage that kind of prescriptions! It is a part of our advertising policy.

I define advertising as something more than printed announcements and circular letters. To me advertising has always meant any effort which would make our business favorably regarded.

There is no direct profit from these difficult prescriptions and orders but the indirect profits are legion. Put yourself in the physician's place. If we are willing to go to infinite pains and trouble to supply just what the physician orders, is it not logical to suppose that he is going to remember and appreciate that service. At another time when he has an unusual prescription or pharmaceutical problem, he comes to us. Friendly relations are established.

This willingness to give superior and unusual service, without thought of immediate profit, has been appreciated not alone by the practicing physicians of Baltimore. The physicians in the medical schools of Johns Hopkins University and the University of Maryland have come to us for their requirements. We have been able to serve them in two ways. We have worked with them in the solution of nice pharmaceutical problems in connection with their medical researches. Many useful products have resulted from these researches. What is more natural than that the firm which coöperated in the pharmaceutical research should be entrusted with their commercial production and sale?

Service thus is fundamental to our advertising policy. But it is only a foundation. Every good building must have a foundation, but the foundation alone is

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** Hynson, Westcott and Dunning, Pharmacists, Baltimore, Md.

not the building. Once we are sure of our products and service the next thing is to tell people about them, not once, but constantly. While our business is a mighty important thing to us, it naturally is but one of many things engaging a physician's attention. We are apt to lose business unless he is constantly reminded of our presence. Yet we cannot harass or antagonize him.

One of the most valuable advertisements we have is our location. Nearly every physician in Baltimore passes our corner at least once daily. Our building is directly opposite Baltimore's leading hotel, a fact which brings us to the attention of hundreds of visiting physicians every year.

The building itself is of a striking design. In fact, customers have jokingly told us that our name on the windows is the only thing that keeps them from mistaking us for a bank. We spend many thousands of dollars every year keeping this building looking its best both inside and outside. Its immaculate and span appearance makes a good impression upon our customers and, just as important, upon our employees. We find that spick and span quarters tend to promote spick and span work. No druggist needs to be told that neatness and exactness are a cornerstone of success in pharmacy.

The work of our detail men is a more evident phase of our advertising policy. In Baltimore they serve the double purpose of interesting physicians in our preparations and in our retail business. We also supplement the work of the detail men by letters and other literature to physicians and also advertise to physicians in professional and scientific journals. To obtain for our preparations the coöperation of druggists outside of Baltimore we also advertise in their trade journals and send them letters and other descriptive matter by mail.

I suppose that some druggists who read this article will feel that our business is so unusual that few of the policies we use would be applicable to them. That is not necessarily the case. It is true that our retail business is unusual; we have no soda fountain and do not carry candy, cigars and many other sundries usually found in a drug store. In fact, 75 per cent of our retail business is in prescriptions and physicians' orders.

A druggist does not have to restrict himself to these items, however, to be a professional success. I could point to hundreds of stores which are just as ethical as we are, yet which have large (and prosperous) soda fountains, a busy cigar counter and an excellent business in perfumes and toilet articles. The thing which makes them a professional success is the fact that they maintain their identity as drug stores. A patient with a prescription or a physician with an order has confidence that his wants will be cared for intelligently and efficiently. Confidence of physicians and the public has been the keystone of our success. This success we constantly have tried to enlarge by persistent, tactful advertising.

THE CASE FOR CONTINUOUS ADVERTISING.

"Well, well, Mrs. Wharton, I haven't seen you in a long time. Where have you been?" The speaker was Elias C. Bohon, neighborhood druggist, as he beamed upon his good customer, Mrs. Mortimer Wharton. Mrs. Wharton lived several blocks from the store, in a section which Mr. Bohon seldom visited, but

her telephone orders had been a constant source of pride and profit to him. A few weeks ago they had suddenly stopped. Mr. Bohon welcomed the chance to ask for an explanation.

"Why, haven't you heard?" answered Mrs. Wharton in surprise, "Mr. Wharton and I have taken an apartment in Lynbrook. The children have all grown up. John and Alice are away at college and of course Beatrice has her own home in Hazel Falls. It's hardly worth while to keep that big house just for the two of us."

"Did you sell your house, Mrs. Wharton?"

"Yes, we were very fortunate, and who do you think bought it? A builder, and they say he is going to convert it into six two- and three-room apartments. We don't like the idea, but I suppose times are changing."

Mr. Bohon thought resignedly of the fine business Lynbrook druggists must be getting from Mrs. Wharton. He also looked forward a few weeks to the time when six young couples probably would be occupying Mrs. Wharton's former residence. He made a mental note to have his boy stop there then and leave his announcements in their mail boxes.

The trade of these new people would probably offset the loss of Mrs. Wharton's business, *if he could get it.* The service, the advertising, the good will, all the things he had done in the past to attract and hold Mrs. Wharton's trade would have to be done all over again to interest these new people.

His reverie was interrupted by the appearance of Mrs. Bertrand Noble. He first knew her as Margaret Dixon, a tiny tot with a mass of blond curls and a sunny smile. Here she was, grown, married and with a home of her own, daily buying a host of merchandise for herself and family, where formerly her wants had been confined to penny candies and ice cream sodas.

"The neighborhood certainly does change," thought Mr. Bohon, as he moved to wait on her. "A person has to keep everlastingly at it if he is going to hold the business he has—let alone increase it."

Mr. Bohon is right. Every druggist has not one but a dozen Whartons and Nobles. Old customers move away, new people take their places, young people grow up, not to mention the innumerable losses which occur from competition between stores.

Consider what this means even in such a city as Philadelphia, generally held to be staid, conservative and slow to change. The total population of the city proper was given as 1,824,000 in 1920. In 1910 it was 1,549,000. This increase of 275,000 in population indicates a change, but by no means all of the change in the population of Philadelphia which has occurred between 1910 and 1920.

Thousands of people have moved to Philadelphia and other thousands have moved away. Many foreign immigrants have arrived and a large number have returned to their native lands. People who were living in 1910 have died before 1920 and thousands of others have been born since 1910. As evidence of this constant turnover of population, publishers of city directories point to the fact that almost 100 per cent of all the names and addresses in a city directory are obsolete after 5 years. That is to say, if an advertiser were to send circular letters to names in a 5-year old city directory, virtually every one of them would be returned to him as undeliverable. Thus, what amounts to a complete turnover of

population has occurred in the comparatively short space of 5 years. Part of this change is due to the causes listed above, and a larger part to the movement of people from one part of the city to another neighborhood. To the down-town druggist this latter change is not especially important but to the neighborhood druggist it is vital.

This complete turnover of population in 5 years means that in the 10-year period between 1910 and 1920 the whole 1910 population of Philadelphia moved twice on an average. Part of these removals were of course merely the result of people moving from one part to another part of Philadelphia. Certainly, it is conservative to say, however, that at least 25 per cent of this change was caused by removals from Philadelphia to other parts of the United States. On this basis the following estimates of changes in the population of Philadelphia have been made.

(a) *Estimated decreases in Philadelphia's population between 1910 and 1920*	
Persons living in 1910 who died before 1920	275,000
Foreign emigrants between 1910 and 1920	64,000
Persons moving away from Philadelphia	690,000
Total decreases between 1910 and 1920	1,029,000
(b) *Estimated removals of people from one part of Philadelphia to another (an average of twice in 10 years for each person)*	2,070,000
(c) *Estimated increases in Philadelphia's population between 1910 and 1920*	
Persons born between 1910 and 1920	346,000
Foreign immigrants arriving between 1910 and 1920	160,000
Persons moving to Philadelphia between 1910 and 1920	798,000
Total increases	1,304,000

Considering Philadelphia as a unit, therefore, an increase in population in 10 years from 1,549,000 to 1,824,000 means not merely an addition of 275,000 people to the city's population. It represents a loss of 1,029,000 people from the causes shown in Table A and a gain of 1,304,000 people from the causes shown in Table C, thus producing a net increase of 275,000 people.

Reduced to percentages, it means that of every hundred people living in Philadelphia in 1910, only 20 of these hundred were in Philadelphia in 1920 (and only a negligible number of these in their 1910 residences). The 80 who were no longer in Philadelphia were replaced by 100 others, thus producing the 20 per cent increase in population.

Now, think of the relation of this population turnover to advertising policy. What happens to the man who stops advertising to-day because he says, "Everybody knows me?" Ten years from now where are the people who knew him? Only 20 per cent remain, and if he is a neighborhood druggist, most of these are not in the trading area of his store.

To-day's advertising attracts and holds present customers. By to-morrow removals and changes will have caused the loss of some of to-day's customers. To-morrow's advertising should attract the trade of new customers so that they may take the place of customers lost.

And so it goes: Continuous advertising through an infinity of to-morrows is necessary to continued business success.

THE DEPARTMENT OF THE NATIONAL ASSOCIATION OF BOARDS OF PHARMACY

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ANNOUNCEMENT.

With this issue of the JOURNAL OF THE AMERICAN PHARMACEUTICAL ASSOCIATION a new activity of the National Association of Boards of Pharmacy is instituted in the form of this Department, to supply timely information not only to Board members but to members of the Profession generally. Few pharmacists aside from those associated directly with the N. A. B. P. realize the work being done for them by their State Boards, as such, and through the N. A. B. P. Through this Department, the N. A. B. P. will endeavor to broaden its field of service by presenting items of Board information of national interest and of information relative to Reciprocity, its privileges and its limitations, etc.

Members of state boards of pharmacy and secretaries of the boards and others who may have a message—or news items—which they think of general interest or importance to the boards in their work or as it relates to the progress and welfare of Pharmacy and protection of the Public which Pharmacy serves, are urged to send such articles and news items to the Editor of this Department, H. C. Christensen, Secretary N. A. B. P., 130 North Wells Street, Chicago, Illinois.

Articles may be sent in at any time when date of publication is left open. If submitted for publication in a certain specified issue of the JOURNAL, copy should be in the hands of the N. A. B. P. Editor as near the tenth of the preceding month as possible. News items received as late as the twentieth of the month will be taken care of, but should be sent in earlier if possible. H. C. C.

GENERAL RULES AND INFORMATION GOVERNING RECIPROCITY IN PHARMACEUTIC LICENSURE BETWEEN 44 STATES AND THE DISTRICT OF COLUMBIA, ACTIVE MEMBER STATES OF THE NATIONAL ASSOCIATION OF BOARDS OF PHARMACY.

Any person who has acquired by examination before a state board of pharmacy a certificate or license as a fully "registered pharmacist" or "licentiate in pharmacy" in a state which is an active member of the National Association of Boards of Pharmacy may be granted reciprocal certificate or license by any other state board of pharmacy or pharmacy licensing body of any state which is also an active mem-

ber of the N. A. B. P. under the following general rules and conditions. There are some exceptions and variations of procedure.

Applicants for reciprocity are required to supply to the Secretary of the National Association of Boards of Pharmacy—H. C. Christensen, 130 North Wells Street, Chicago, Illinois—detailed information regarding his or her qualifications such as preliminary education, college of pharmacy graduation (if a graduate), names of schools, date of graduation, drug-store experience under a registered pharmacist giving name of employer, length of time of employment (specifying dates), when and in what state registered by examination, etc. Preliminary blanks on which to supply this information may be had without charge by applying to the Secretary of the National Association of Boards of Pharmacy or to the various state board secretaries.

When a properly executed preliminary information blank, with the required $15.00 fee, is received by the Office of the Secretary of the National Association of Boards of Pharmacy, and if the applicant's qualifications, etc., appear to be sufficient, the official Reciprocal Application Blank will be issued to such applicant with full instructions for executing and filing the same with the Secretary of the Board of Pharmacy in the state in which reciprocal registration is desired.

Information will accompany the official Reciprocal Application Blank as to amount of fee required by the state board certifying to registration and grades of the applicant—usually $1.00—and amount of state registration fee—usually $10.00 to $25.00.

If it appears from the information submitted that the applicant is *not* eligible for reciprocal registration in the state he names, the entire $15.00 fee will be returned without the official Reciprocal Application Blank being issued. However, should the official blank be issued by the National Association, be completed and filed by the applicant and then, for some reason which the Secretary was unable to determine beforehand, be rejected by the Board to which application is being made, the applicant may return the rejected application to Secretary Christensen, with explanation as to why registration was refused, and be allowed a refund of $10.00.

In considering the eligibility for reciprocity of an applicant, the Secretary of the National Association of Boards of Pharmacy first considers the original date the applicant was registered by examination, because the requirements the applicant must meet are those which were in effect in the state to which application is being made, at the time the applicant was registered in the state from which he is applying. It is therefore not necessary, generally, that he meet any additional requirements which may have become effective *since* the date of his original registration.

This means, of course, that the applicant must have had the legal qualifications *at the time* of examination and registration in the state from which he applies which would *at that time* have enabled him to qualify for examination and registration in the state to which he is applying for reciprocal registration.

For example: Suppose a non-graduate pharmacist registered in 1920 in a state which did not require college of pharmacy graduation for entrance to examination. After registering in that state, the registrant decided to take a college of pharmacy course and graduated. Then he wished to register in another state which happened to have required college graduation before 1920, the date he was originally regis-

tered. Even though he is now a college graduate, he is not eligible for reciprocal registration in this latter state because *at the time* he took examination in the state from which he is applying he did not have college training and therefore could not then have qualified for examination and registration in the state to which he now would like to apply for reciprocal registration.

The following general rules and requirements are govening factors in Reciprocity:

GENERAL RULES AND REQUIREMENTS OF RECIPROCITY.

The applicant for reciprocal registration in a state must present evidence of good moral character from two registered pharmacists. Forms to be filled in appear on page two of the official N. A. B. P. application blank.

He must have had, prior to examination and registration as a pharmacist, at least four years of legal pharmaceutical training and experience under a duly registered pharmacist or duly registered licentiate in pharmacy in a pharmacy or drug store where physicians' prescriptions are compounded and dispensed.

Provided, that if before examination and registration he was a graduate of a two-year course of any generally recognized school or college of pharmacy, he may be accredited—not to exceed two years—on the above required four years of pharmaceutical training under a registered pharmacist.

Further, if a graduate, prior to examination and registration, of a three-year course or a four-year course of any generally recognized school or college of pharmacy he may, in some states, be accredited up to but not to exceed three years on the required four years of pharmaceutical training under a registered pharmacist.

Provided, however, that every applicant for reciprocity must have included in the required four years of pharmaceutical training never less than one year of service and experience in a retail pharmacy or drug store where physicians' prescriptions are compounded and dispensed by or under the supervision of a pharmacist duly registered in the state in which such pharmacy or drug store is located.

Provided, further, that he must have had, prior to his examination and registration in the state from which he applies, the legal qualifications necessary *at that time* for applicants for examination and registration in the state to which he applies for reciprocal registration.

He must have passed an examination in at least Pharmacy, Chemistry, Materia Medica and Practical Work —Actual Compounding—and made not less than 75 per cent general average and not less than 60 per cent in any one branch or subject. Pharmaceutical and Chemical mathematics, as a separate branch or subject, has been required since January 1924.

He must have practiced his profession, under legal conditions, at least one year since registration.

He must be in good standing in the state from which he applies, relative to renewals, etc. Space is provided on the official N. A. B. P. application blank for showing record of qualifications as outlined above.

A section of the By-Laws of the Association supplemental to the general rules governing reciprocity provides that inability of an applicant for reciprocal registration to meet certain present-day requirements shall not, under general conditions, prevent a state board of pharmacy from considering such an applicantion and granting reciprocal registration, provided that after due consideration the applicant is deemed to be otherwise fit and worthy.

This supplemental clause of the By-Laws (Clause "i," of Article 2) reads as follows: *"That no condition in the by-laws shall prevent a state board of pharmacy from granting reciprocal registration to applicants who on account of omission, lack, loss or destruction of records, or for other reasons, may not be able to fully comply with the general requirements, or furnish detailed evidence of certification of grades made in examination."*

There is no general reciprocity for graduate pharmacists registered on college diploma without state board examination, excepting that in some states arrangements have been made through the N. A. B. P. which permit reciprocal registration under certain conditions, to such graduate pharmacists provided their original registration on diploma was prior to January

1, 1910, and that they have practiced pharmacy at least ten years since registration, and provided further, *that the applicant had at the time of such registration the legal qualifications which would have entitled him at that time to examination and registration as a pharmacist in the state to which he wishes to apply for reciprocal registration.*

To obtain reciprocal registration for this class of registrants the office of the Secretary of the N. A. B. P. procures from the college, grades made by the applicant in his college examinations. These grades, certified by the proper college officials, are then forwarded to the Secretary of the Board of Pharmacy in the state in which the applicant registered on diploma, to be entered by him on the records as having been accepted in lieu of state board examination. Certification to that effect is then made on the applicant's reciprocal application, showing the grades made in examination.

Applicants for reciprocal registration must file their applications with the Secretary of the Board of Pharmacy in the state in which registration is desired, within ninety days after date of issue of the application blank, otherwise it becomes null and void both as to reciprocity and refund.—H. C. C.

WARNING OF THE IOWA BOARD REGARDING THE EMPLOYMENT OF UNREGISTERED HELP.

(The practice mentioned in the notice published below, which has just been sent out by the Iowa Pharmacy Examiners, is sufficiently common in all states to warrant the presentation generally of similar warning and appeal.

The Iowa Pharmacy Examiners are to be congratulated on their attitude in this matter and it is hoped other Boards will recognize the growing menace of this dangerous practice and endeavor to enlist the coöperation of loyal pharmacists in controlling it.—H. C. CHRISTENSEN, *Editor*.)

"To Drug Store Proprietors,
Gentlemen:

"Certain conditions concerning the operation of the Drug Stores of * * * have been observed during the past year which the Board of Pharmacy desires to call to your particular attention. The Pharmacy laws of Iowa were designed to control the method of conducting such stores with the object in view of protecting the public, who are patrons of these stores. The State and Federal laws have given you certain privileges and in return have placed on you certain responsibilities. In the conduct of your store you have assumed these responsibilities and the public in all confidence, is expecting you to discharge these duties with which you are entrusted.

"The matter to which we are directing your attention is the fact that unregistered help is being employed to an alarming extent. In many instances the stores are in charge of incompetent employees for approximately one-half of the time that these stores are open for business. We mean by *incompetent*, that such unregistered help cannot, according to law, assume the responsibility of dispensing drugs and medicines, selling poisons, and filling physicians' prescriptions. We feel that such duties cannot be confined to the hours when registered clerks are in charge, especially if such registered clerks are on duty only one-half of the time. Section 2582 of the Iowa Code plainly states that: 'No licensed pharmacist shall allow anyone who is not a licensed pharmacist to sell, or offer or expose for sale, or dispense drugs and medicines, or fill the prescriptions of licensed physicians, dentists, and veterinarians, unless the same be done *by or under the supervision* of a licensed pharmacist.'

"This brings us to the proposition as to what 'under the supervision of a licensed pharmacist,' means. Whatever else it may be construed to mean, we are certain that it *does not mean* that when a registered man is not in the store, the business of dispensing drugs and medicines, selling poisons, and filling prescriptions shall continue in the same manner as when a pharmacist is present. Certainly the law does not contemplate that the public shall be protected only certain hours of each day. The patrons of your store who happen in during the hours when no pharmacist is in charge are entitled to the same careful service as those who visit it at other hours.

"Let us call to your attention the fact that it is an indictable offense for unregistered persons to sell poisons in the absence of registered or licensed pharmacist and that if it does

occur and such evidence is presented to the Board of Pharmacy, it will be necessary for said Board to proceed against such proprietor.

"If Pharmacy as a Profession is to maintain the respect to which it is entitled, men who understand the business should be the only persons privileged to practice it. This does not mean that unregistered clerks or salesmen may not be employed. In these days of intense merchandising, such help is without a doubt a necessity, but they should *not* be called upon to assume the duties of a pharmacist. * * *.

"* * * * * * if we are to be law abiding citizens, we should endeavor to conduct our business according to the laws governing that business.

"We sincerely hope * * * that we may have the coöperation of all pharmacists and employers * * *."

(Signed) PHARMACY EXAMINERS { J. W. SLOCUM, GEORGE JUDISCH, W. W. HAIRE
SECRETARY H. E. EATON

DISTRICT MEETINGS.

District No. 6: Wilford H. Harrison, President of the Texas Board of Pharmacy, N. A. B. P. Vice-President and Chairman of District No. 6, comprising the states of Arkansas, Kansas, Missouri, Oklahoma and Texas, has called a meeting of that district to be held in San Antonio, Texas, Thursday and Friday, January 21 and 22, 1926. Chairman Harrison reports that every state in the district will be represented at the meeting.

District No. 7: John E. Guess, Secretary of the Louisiana Board of Pharmacy, N. A. B. P. Vice-President and Chairman of District No. 7, has reported Monday and Tuesday, January 25 and 26, 1926, as tentative dates for the holding of a meeting of the district at Jackson, Mississippi. States comprising District Number 7 are Alabama, Georgia, Florida, Louisiana and Mississippi. Indications to date are that all of the states in the district will be represented.

STATE BOARDS OF PHARMACY NEWS ITEMS.

Alabama: Hal E. Duncan of Birmingham, Alabama, has been appointed a member of the Alabama Board of Pharmacy, to succeed John T. Roe who has moved out of the state. Board members include S. A. Williams of Troy, President; W. E. Bingham of Tuscaloosa, Secretary; W. P. Thomason of Guntersville, Treasurer, and L. C. Lewis of Tuskegee. The next meeting of the Alabama Board of Pharmacy will be held in Birmingham, February 9, 1926.

Colorado: The State of Colorado Board of Pharmacy will hold an examination meeting in Denver, January 15–16, 1926. The Board, in view of the small percentage of successful candidates for "registered Pharmacist" in recent examinations, suggests that a larger proportion of the candidates prepare for and take the examination for Assistant Pharmacists. The statement is also made that "it would be much better for both employers and unregistered clerks if the latter, instead of going against the more difficult test, in which non-graduate candidates have but small chance of making the grade, would first qualify as Assistants, and then take plenty of time for preparation before coming back for examination for Registered Pharmacists."

Idaho: On the fifth of January 1926, will be held the next Idaho Pharmacy examination, to take place in Boise. The Bureau of Licenses of this state expresses the belief that the N. A. B. P. should require all applicants to submit certified unmounted photographs as a means of identification when applying for reciprocal registration.

Illinois: L. P. Larsen and J. A. Topf, both of Chicago, have succeeded Charles G. Foucek and Dan P. Seibert, also of Chicago, as members of the Illinois Board of Pharmacy Examiners. Illinois' next Pharmacy examination will be held in Springfield January 12–15, 1926.

Iowa: The Iowa Pharmacy Examiners have set January 20 and 21, 1926, as the dates for their next examination to be held in Des Moines. At the examination held last October, twelve out of a class of forty-three were successful.

Kansas: The Kansas Board of Pharmacy held an examination meeting on November 4 and 5, 1925, at which time thirty-eight applicants took the examination. Of this number six were granted Registered Pharmacist licenses and sixteen Assistant Pharmacist licenses. The next Kansas examination will be held Feburary 3 and 4, 1926.

Kentucky: At a recent examination eleven candidates out of a class of twenty-six made the required general average of 75% with not less than 60% in any one branch or subject, entitling them to registered pharmacist certificates. Two candidates of a class of five were granted registration as Assistants.

James F. Wilson, Mayfield, was elected President of the Board and J. W. Gayle, of Frankfort, Secretary. Mr. Gayle has served as Secretary of the Board for twenty-seven years. The recent death of G. Orville Patterson, a member and Chairman of the Executive Committee of the Board, leaves a vacancy.

Louisiana: The next examination meeting will be held at New Orleans on Feburary 19–20, 1926. John E. Guess, Hammond, is Secretary.

Fabius C. Godbold, active for a half century in Pharmacy, died on November 8th, at the age of 84. Mr. Godbold was one of the organizers of the N. A. B. P. in 1904 and was the third President elected to that high office, in 1906. He was Honorary President of the AMERICAN PHARMACEUTICAL ASSOCIATION, charter member of the Louisiana Board of Pharmacy, and Secretary of the Board for over twenty years. His service to Pharmacy and his counsel in Association and College activities locally and nationally were extensive and of a more than ordinarily helpful nature.

Maryland: Of interest in the Pharmacy World will be news of the departure from Hagerstown, Maryland, of H. Lionel Meredith, President of the National Association of Boards of Pharmacy for the year 1924–25, and up to the time of his resignation, President of the Maryland Board of Pharmacy. The magnet of the Florida boom evidently proved to be too great for Mr. Meredith, for almost unbeknown to his many friends, he disposed of his property in Maryland and moved to Florida. Mr. Meredith was a member of the Maryland Board of Pharmacy since 1903 and has been active in N. A. B. P. work for many years. Governor Ritchie has appointed Mr. Lloyd N. Richardson, of Bel Air, to fill the vacancy on the Board caused by Mr. Meredith's resignation. Mr. Richardson has been engaged in retail pharmacy since 1912. He is a graduate of the University of Maryland College of Pharmacy. The Maryland Board of Pharmacy will meet during the first week in January 1926 to effect an organization.

Massachusetts: The annual meeting of the Massachusetts Board of Registration in Pharmacy was held December 1st for the election of officers for the ensuing year. Frederick A. Brandes, Worcester, was reëlected Secretary. The other members of the Board include William Hardie, Fall River, succeeding John M. Kelleher who just completed his five-year term, William R. Acheson, Cambridge and Frederick W. Archer, Boston.

Minnesota: The Minnesota Board of Pharmacy will meet on January 11, 1926, for its quarterly examination meeting.

A full-time inspector is now employed by the Minnesota Board to investigate violations of the pharmacy law. Owners of general stores permitted under the law to handle certain so-called "patents" and household remedies, who formerly used the words "drugs," "drug store," "pharmacy," etc., for advertising and display purposes without a registered pharmacist in charge, are now prohibited from doing so. The Board has also sent out a warning to pharmacists, general stores, etc., that aspirin may be sold only by or under such persons as are by law permitted to sell and dispense drugs, etc., this order is on the strength of a ruling by the Attorney General's Office.

The Minnesota Pharmacy Law declares, in effect, that no person not a registered pharmacist or a dealer employing and carrying a registered pharmacist in active charge of his place of business shall retail drugs, medicines or poisons, excepting that certain specified "patents" and household remedies are exempted from the provisions of the law and may therefore be sold by general stores, etc.

In the ruling of the Attorney General's Office, attention is called to the fact that aspirin is not included in the list of drugs and preparations exempted under the law. This, it seems, is the basis for the warning by the Board regarding the sale of aspirin.

Mississippi: Of much importance and interest is an opinion issued by the Attorney

General of the State of Mississippi in regard to its prerequisite law and Reciprocity. Heretofore, all pharmacists coming into the State of Mississippi after January 1, 1921, were required to be college of pharmacy graduates, regardless of the fact that they might have been registered in some other state prior to this date. This has been in opposition to the general rules governing reciprocity requirements. The Attorney General has now issued an opinion that the Mississippi Board of Pharmacy can legally accept for reciprocal registration, non-graduate registered pharmacists who were registered in other states prior to January 1, 1921, when the present prerequisite and reciprocal law went into effect.

The Mississippi Board will have its next meeting January 12 and 13, 1926.

Missouri: The next regular meeting of the Missouri Board of Pharmacy will be held at the Capitol Building, Jefferson City, on the 11th and 12th of January 1926. President H. W. Reuter of the Board and H. C. Tindall, a former secretary, were recently summoned to Washington, D. C. to testify in the Federal Courts relative to the charge of fraudulent use of the United States mails by certain correspondence or short course schools—including courses in pharmacy. The outcome of this court procedure will be awaited with interest in many parts of the country.

Montana: Pursuant to a referendum vote by the pharmacists of Montana, the Board of Pharmacy of that state will require high-school and pharmacy-school graduation as a prerequisite for entrance to examination and registration as a Pharmacist, beginning January 1, 1926. Provided, however, that exemption from the graduate in pharmacy requirement will be allowed to apprentices registered as such with the Board, who are employed in any retail pharmacy under a registered pharmacist at the time of the college requirement becoming effective.

(J. A. Riedel, Boulder, Montana, is Secretary of the Montana Board of Pharmacy. He is also Secretary-Manager of the Montana-Wyoming division of the "Rocky Mountain Druggists Council." Mr. Riedel is a live wire and is doing commendable work for the druggists of his district. He has a way all his own which is effective and brings results. He has promised to write an article later on for this Department and tell how the work carried on in his district, while at present tending toward the commercial side, will gradually make the ethical side of Pharmacy "edible."—H. C. C.—*Editor.*)

New Jersey: At the last session of the New Jersey State Legislature several changes were made in the Pharmacy Law which will be of interest. The privilege formerly extended to "ex-service men," who were engaged in the drug business at the time of enlisting in the Government service, of being exempt from the college graduation requirement, has now been withdrawn so that hereafter all applicants for examination and registration as pharmacists in New Jersey must be graduates of an approved college of pharmacy.

The requirements for Assistant Registration now include that the applicant must have completed a four-year high school course—or its equivalent—and must also have successfully completed at least one term in an approved college of pharmacy.

Ohio: At a recent meeting of the Ohio Board of Pharmacy it was unanimously voted to change the minimum grade requirement to 60 per cent—to conform with N. A. B. P. standard requirements—a general average of 75 per cent with not below 60 per cent in any one branch or subject.

Mr. C. W. Antony of Canton was elected President of the Board.

Texas: The Texas Board of Pharmacy will hold an examination meeting in San Antonio, Texas, Tuesday, Wednesday and Thursday January 19, 20, 21, 1926. A meeting of District No. 6, called by N. A. B. P. Vice-President, Wilford H. Harrison of the Texas Board, will convene on the closing date of the Examination Meeting and extend over Friday January 22nd.

Virginia: D. E. Seagle, Pulaski, has been appointed to finish the unexpired term on the Virginia Board of Pharmacy, of W. D. Clark, of Portsmouth, who resigned on November 21, 1925. Mr. Seagle graduated from the Pharmacy Course of the Medical College of Virginia in 1902. He served as President of the Virginia Pharmaceutical Association in 1920.

Regular meetings of the Virginia Board at which examinations are conducted are held in Richmond in June and November. Annual business meeting—no examinations—during the last week in April.

Washington: The State of Washington will hold its next examination at the University of Washington Pharmacy College on January 4, 1926.

THE DEPARTMENT OF THE AMERICAN ASSOCIATION OF COLLEGES OF PHARMACY

(It is not often that a State Pharmaceutical Association makes the first move toward the securing of pharmaceutical instruction by an appropriation from the state. The situation in Florida has received considerable attention and therefore the following article by Dr. W. J. Husa is timely, and I hope it will be read by the officers of the several pharmaceutical associations. Signed C. B. JORDAN, *Editor*.)

PHARMACEUTICAL EDUCATION IN FLORIDA.

BY WILLIAM J. HUSA.*

The desirability and need of a College of Pharmacy was long recognized by the pharmacists of Florida. Their high ideals for pharmacy and their understanding of the trend of pharmaceutical education are shown, for example, by the following remarks of President W. G. Perry in his address before the Florida State Pharmaceutical Association in 1922:

"The day of the private institution for teaching pharmacy, valuable as it once was, has gone by. Laboratory equipment, and the modern accessories of teaching now needed, mean the establishment of a plant which only the state or a richly endowed institution can finance.

"So we should work for our University School of Pharmacy. Reconstruction of educational methods since the cessation of the world war has given a new impetus to the study of pharmacy, and the ablest thinkers in the calling are unanimous in the belief that higher entrance requirements and more scientific training are necessary to meet the demand for well-trained pharmacists. It is argued that not until the average druggist becomes something more than a commercial handler of medicines can he hope to be recognized as a professional man or to be considered as a promising candidate for a commission in the Government service. Surely the trained pharmacist is needed to assist the physician in his work and unless he is competent to make analyses, bacterial determinations and related investigations, qualifications which can be learned only in the college and laboratory, his opportunities for advancement will be of little avail."

In 1923, at the urgent request of the State Board of Pharmacy and other pharmaceutical organizations, and with their assistance, the University of Florida established a School of Pharmacy. After two years of development, this has now become the College of Pharmacy.

Due to crowded conditions at the University, the new pharmacy department was forced to make its debut in a basement under conditions unfavorable for superior pharmaceutical work. However, this condition will be remedied in about a year by the construction of the first wing of a new building, the construction of which was authorized by the last Legislature.

In spite of the inadequate quarters, excellent work has been done, due largely to the fine spirit shown by the faculty and students and to the splendid apparatus and equipment, furnished to a large extent by funds donated by members of the Florida Pharmaceutical Association. The pharmacists who contributed to this fund cannot be commended too highly; they showed the true spirit of pharmacy in striving to make their profession of greater service to humanity.

Many leaders in pharmacy favor the selection of professors who hold the degree of Doctor of Philosophy, the highest degree granted in course, in addition

* Professor of Pharmacy, University of Florida.

to professional degrees in pharmacy, and practical drug-store experience. Florida's three professors in the strictly pharmaceutical branches meet these requirements in every particular and each one has had, in addition, considerable experience in industrial pharmaceutical or chemical research. Most of the professors in the other branches which make up the pharmacy curriculum, such as chemistry, physics etc., also hold the Ph.D. in their respective branches.

At the last regular session of the Florida legislature, the State Board of Pharmacy was given authority to set the educational standards for candidates for registration as pharmacists. It is expected that the college prerequisite will go into effect by Board ruling in about two years.

These achievements constitute Florida's answer to the question of what shall be done to raise the standards of pharmacy and pharmaceutical education.

PROCEEDINGS OF THE LOCAL BRANCHES

"All papers presented to the Association and Branches shall become the property of the Association with the understanding that they are not to be published in any other publication prior to their publication in those of the Association, except with the consent of the Council." —Part of Chapter VI, Article VI of the By-Laws.

Article IV of Chapter VII reads: "Each local branch having not less than 50 dues-paid members of the Association, holding not less than six meetings annually with an attendance of not less than 9 members at each meeting, and the proceedings of which shall have been submitted to the JOURNAL for publication, may elect one representative to the House of Delegates."

Reports of the meetings of the Local Branches should be mailed to the Editor on the day following the meeting, if possible. Minutes should be typewritten, with wide spaces between the lines. Care should be taken to give proper names correctly, and manuscript should be signed by the reporter.

CHICAGO.

The 154th meeting of the Chicago Branch, AMERICAN PHARMACEUTICAL ASSOCIATION, was held at the School of Pharmacy Bldg., Friday Evening, December 11.

The meeting took on the nature of a reception to new members received during the year 1925. Acting President, J. A. Hynes, called upon the new members in the audience of about 250, to stand and he introduced them to their fellow members.

The members of the Lambda Kappa Sigma Sorority presented a play entitled "A Southern Cinderella" with the following synopsis and cast of characters.

Place—A southern home.

Act. I. Living room at Charteris Hall
Act. II. Same—Three days later
Act. III. Same—Two years later

Cast of Characters.

Madame Charteris.....Barbara Hynes
Enid Bellamy.....Ethel Herdlicks
Miss Rosie Winterberry....Estelle Warczak
Miss Jonnie Bell Randolph....Agnes Hunkler
Katherine Hawke.....Catherine Curran
Caroline Hawke.....Evelyn Caron
Mammy Judy Johnson.....Alice Haller

Splendid music by the school orchestra was an added attraction. The play was followed by refreshments and dancing. This is the fourth annual event of this type and was universally pronounced to be better than any of the others.

E. N. GATHERCOAL, *Secretary.*

CINCINNATI.

The Cincinnati Branch of the AMERICAN PHARMACEUTICAL ASSOCIATION met for its regular monthly meeting at Ohio Valley Druggists' Association Headquarters, November 17, 1925, with President H. E. Igler in chair.

At this meeting Frank H. Freericks gave a most interesting and comprehensive report of the annual A. PH. A. convention, held in Des Moines. Officers for the year 1925–1926 are as follows:

President, H. E. Igler
First Vice-President, H. B. Waltermann
Second Vice-President, O. E. Kistner
Treasurer, W. L. B. Brittain
Secretary, Bertha Ott
Member of Executive Committee, F. S. Kotte

At the meeting of December 15th, Dr. H. W. Bettmann, of Cincinnati, gave a most instructive talk on "Habit-forming Remedies, Containing Acetanilid."

From years of practical experience Dr. Bettmann, gave many illustrations of individuals who had become addicted to remedies containing Acetanilid, and Antipyrin, Antifebrin and other preparations used mainly against headache and neuralgia.

Most acetanilide habitués are users of popular proprietaries.

He also gave warning against the use of tablets containing acetanilid and caffeine; he said caffeine does not overcome the depressing effect of acetanilide.

Dr. Bettmann said legislation is needed to prevent the sale of proprietaries containing acetanilid and the like, except on physicians' prescriptions.

Discussions following this interesting talk brought out the fact that acetanilid was being used as snuff to take the place of cocaine. Related products, also habit-forming, are used indiscriminately.

BERTHA OTT, *Secretary.*

DETROIT.

The December meeting of the Detroit Branch of the AMERICAN PHARMACEUTICAL ASSOCIATION was held at the Wayne County Medical Building, Friday, December 11, 1925.

The largest attendance of the year was greeted by a brilliantly lighted Christmas tree and the old fashioned red Christmas stockings were filled to overflowing, through the kindness of Parke, Davis & Co., F. F. Ingram Co., and The Charles F. Mann Co. An excellent Christmas dinner preceded the meeting which was a big success and highly gratifying to the officers.

The meeting was called to order by President Rowe at 8:15 P.M. He sounded a hearty welcome to the large gathering, particularly to the many students from the College of the City of Detroit.

Mr. Rowe announced that the speaker for the January meeting would be Mr. F. F. Ingram, and also that Dr. H. V. Arny, former President of the A. PH. A., probably would honor the Detroit Branch with a talk at the February meeting.

Mr. Webster suggested, if it would be possible for Dr. Arny to come to Detroit for the February meeting, that arrangements be made to meet with The Wayne County Medical Society, in order to give the speaker a fitting audience.

Mr. Seltzer suggested that the Medical Association be invited. This suggestion seemed to meet with hearty approval.

President Rowe then introduced the speaker of the evening, Mr. Leonard A. Seltzer, who inspired by the large attendance and the many students, gave a most interesting talk and blackboard illustration on the "Art of Prescription Pricing." Mr. Seltzer's plan was interesting to every one because of its elasticity. He outlined his idea in a way that it could be applied to all retail stores whether large or small. The sum total of Mr. Seltzer's scheme was a uniform price—whether one clerk or a dozen were employed the price for the same prescription would always be alike.

A general discussion followed, led by Messrs. Schettler and Webster. Mr. Seltzer answered the many questions that came up.

A rising vote of thanks was tendered the speaker.

BERNARD A. BIALK, *Secretary.*

PHILADELPHIA.

The November meeting of the Philadelphia Branch of the AMERICAN PHARMACEUTICAL ASSOCIATION was held at the P. A. R. D. Building, 2017 Spring Garden St., Tuesday evening November 17th, President Smith presiding.

The minutes of the October meeting were read and approved. Benjamin B. Ominsky was accepted into associate membership.

A motion was passed to have a notice placed in the P. A. R. D. bulletin, regarding the activities of the Local Branch, and urging the retail pharmacists to join its ranks.

A second motion was passed to have the President and Secretary get in touch with the officers of the P. A. R. D., and attempt to arrange a joint meeting for December, at which time Prof. E. Fullerton Cook, Chairman of the U. S. P. Revision Committee, will speak on the changes in the new "Pharmacopœia," a question of vital interest to the retail trade, as the U. S. P. X became official January 1, 1926. This joint session will be held at 10:30 P.M., the regular hour for P. A. R. D., meetings,

in order to have as many present as possible. Light refreshments will be served at the close of the meeting.

The President introduced Mr. H. J. LaWall, who gave a very interesting talk on "Drug Store Bookkeeping." Mr. LaWall first spoke of the absolute necessity for a pharmacist to have a good set of books in order intelligently to conduct his business, as with a poor set or, as is found in many instances, no books at all, one is never able to tell where he stands with his business. Executives in large institutions or corporations rely entirely upon the records of books and would not think of doing without them, and the sooner the small business man realizes what can be accomplished in this way the better off will he be.

Mr. LaWall did not think a double entry system practical for the average retailer as the principles are not so readily understood. He showed a special system which is being used more and more in drug stores, one which is very simple in operation and yet gives very accurate data for daily, monthly, and yearly use.

It consists of a set of daily sheets with columns for sales, cash receipts, cash expenditures and daily statements showing cash balance, bank balance and total cash on hand at the close of each day. These totals are transferred to monthly sheets and the monthly records in turn are transferred to yearly sheets, both monthly and yearly sheets having their headings arranged in statement form. Thus one readily finds all his necessary facts and is able to see at a glance just where he stands on every issue. One is able to check up monthly or yearly, against previous records and note overhead or profit quickly. A statement of percentages is also very valuable as it acts as a barometer of the business and enables the druggist to discern errors of business management. Finally, a statement is prepared which shows the net profit for the year; a simple statement of resources and liabilities, which is very valuable, is also given on the yearly sheet.

This system is easily understood, many stores arrange for school boys or girls, or the store boy to enter the records, which only require a few minutes each day.

A general discussion followed Mr. LaWall's presentation, and special remarks were made by F. P. Seibert and E. Fullerton Cook.

ADLEY B. NICHOLS, *Secretary.*

DECEMBER MEETING.

The December meeting of the Philadelphia Branch of the AMERICAN PHARMACEUTICAL ASSOCIATION was held Friday, December 11, at the P. A. R. D. Building, 2017 Spring Garden Street, about sixty members and friends being present.

President Smith called the meeting to order at 11 P.M. Due to the lateness of the hour, a motion was passed to dispense with the reading of the minutes of the previous meeting. The name of A. G. Keller, 161 2nd St., was proposed and accepted for associate membership in the branch.

President Smith then introduced Prof. E. Fullerton Cook as the speaker of the evening. Professor Cook gave a very interesting and instructive talk on the new Pharmacopœia, pointing out the main changes in titles, the changes in ingredients of many preparations and the reasons for these various changes. The majority of those present were retail druggists, and Professor Cook's comments were eagerly listened to, as he outlined the high points of revision and brought to their attention the things that would most concern them, January 1, 1926, when the U. S. P. X goes into effect.

Mr. Hendrickson, of Smith, Kline & French Co. had carefully prepared samples of all preparations the components of which had been changed in the new book, and these were passed around as the various ones were discussed.

At the close of Professor Cook's presentation the subject was discussed by Messrs. England, Hunsberger, McNeary, Matusow, Davis, Eberle and others.

A motion was passed that the secretary express to Professor Cook the thanks of the branch for giving them such an interesting and valuable talk.

The date and time of this meeting had been changed to make it possible for more retailers to be present and the attendance showed very satisfactory results along this line. It was suggested that the Branch hold its meetings on the first Friday of the month at the usual hour (eight o'clock) as the P. A. R. D. meets later on the same evening, and it was felt that this change would be of mutual benefit to both organizations as there are many pharmacists who would like to attend both meetings but found it impossible to devote two evenings. Considerable discussion followed and a motion was finally made to refer the matter to the officers to report at the next meeting. Mr. Hunsberger pointed out the fact that the plan would be of particular value

this year as the two bodies could work out plans for the 1926 Conventions more advantageously.

Sandwiches and coffee were served after the conclusion of the evening's program.

ADLEY B. NICHOLS, *Secretary*.

UNIVERSITY OF WASHINGTON.

The December meeting of the University of Washington branch was held December 11, at Bagley Hall. President Bradshaw presided. Mr. Seidenfeldt submitted a preliminary program for the spring meetings. Among the speakers who will address the branch are: R. C. Lyle, Director of Prohibition, for the Northwest District, who will talk on "Federal Prohibition and Its Relation to the Pharmacist." H. W. Williamson, Inspector in charge of the Narcotic Division, who will talk on "Narcotic Traffic." Harry W. Ayres, Secretary for the Washington State Pharmaceutical Associations, who at present is "visiting" at state legislative sessions, will talk on "Pharmacy Legislation and How It Comes." Dr. Seibert, of H. A. Metz and Co. will talk on "New Remedies." Mr. Seidenfeldt was commended for his activity in procuring these speakers.

President Bradshaw introduced Mr. J. E. Sohlberg of the Upjohn Company who presented a brief talk on pharmaceutical, production and trade policies. An informal discussion followed.

H. A. LANGENHAN, *Secretary*.

WORLD TRADE IN TOILET PREPARATIONS.

The Chemical Division of the Bureau of Foreign and Domestic Commerce is now engaged in making a survey of the production and distribution of toilet preparations in foreign countries and the trade opportunities abroad for American exporters of this class of products. The first part of this survey which included reports submitted by the official representatives of the Government stationed in Western European countries was published as Trade Information Bulletin No. 344, "World Trade in Toilet Preparations." This pamphlet may be purchased from the Superintendent of Documents, Government Printing Office, Washington, D. C., upon payment of 10 cents, or from any of the Bureau's District Offices.

It was contemplated that all the material would be issued in Trade Information Bulletins similar to the above, and presented by continents, but in order to avoid the delays attendant upon the receipt of the reports from a large number of contributing sources it is found necessary to publish the remaining reports in mimeographed form. They will be issued weekly if possible, under the same title as the bulletin referred to above and supplementary to it.

The Division has for some time been issuing reports on World Trade in Prepared Medicines; the last one is No. 11 and relates to Netherlands East Indies. The information given in these reports is accurate and comprehensive. Editorial comment on this service was made in the November JOURNAL.

THE COMMERCE YEARBOOK FOR 1924 NOW READY.

The third issue of the "Commerce Yearbook" is now ready and may be had from the Superintendent of Documents, Government Printing Office, Washington, D. C., for $1.00 in currency or money order.

Some of the interesting features of the "Yearbook" are:

A foreword by Secretary Hoover.

A summary of the general trend of business through the year with a discussion of the basic factors that influenced trade.

An analysis of the results of the last census of manufactures which have just become available.

A survey of industrial and agricultural production.

A record of wholesale and retail prices.

A detailed discussion of finance, banking and the security markets.

A thorough review of building and construction operations.

A study of developments in the machinery, iron and steel, textile, leather, paper, automotive, rubber, chemical, lumber and other leading industries.

Essential data on transportation and communication.

A comprehensive survey and analysis of the foreign trade of the United States.

Résumés of economic developments in the principal foreign countries.

EDITORIAL NOTES

Editor: E. G. EBERLE, 10 West Chase St., Baltimore, Md.

Members of the Council, A. PH. A.: S. L. HILTON, *Chairman;* W. C. ANDERSON, *Vice-Chairman;* E. F. KELLY, *Secretary;* JAMES H. BEAL, CHARLES H. LAWALL, HENRY M. WHELPLEY, H. V. ARNY, A. G. DUMEZ, H. C. CHRISTENSEN, JULIUS A. KOCH, ROBERT P. FISCHELIS. *Ex-Officio;* L. L. WALTON, President; Vice-Presidents, W. C. ANDERSON, CLYDE L. EDDY; E. F. KELLY, Secretary; C. W. HOLTON, Treasurer; WILLIAM D. JONES, Chairman of the House of Delegates. Editors of the JOURNAL and YEAR BOOK: E. G. EBERLE and A. G. DUMEZ. Committee on Publications: R. P. FISCHELIS, *Chairman;* H. V. ARNY, H. M. WHELPLEY, E. F. KELLY, C. W. HOLTON, A. G. DUMEZ, E. G. EBERLE.

Collaborators: The Members of the Council; the Editor of the YEAR BOOK, A. G. DUMEZ; E. FULLERTON COOK; Chairman, U. S. P. Revision Committee; W. L. SCOVILLE, Chairman, N. F. Revision Committee; the Chairmen of the Sections, A. PH. A.: F. F. BERG, J. G. BEARD, H. C. NEWTON, AMBROSE HUNSBERGER, L. K. DARBAKER; WILLIAM D. JONES, Chairman of the House of Delegates, A. PH. A.; EDWARD H. KRAUS, President, A. A. C. P.; CHARLES B. JORDAN, Chairman Executive Committee, A. A. C. P.; M. N. FORD, President, N. A. B. P.; HENRY C. CHRISTENSEN, Secretary, N. A. B. P.

COMPLIMENTARY DINNER TO THE EDITOR IN PHILADELPHIA.

The pharmacists of Philadelphia tendered E. G. Eberle, Editor of the JOURNAL AMERICAN PHARMACEUTICAL ASSOCIATION, a dinner, December 28, during the week of his departure for Baltimore where the offices of the ASSOCIATION and those of the JOURNAL now are located.

More than forty pharmacists and members of their families attended the function at the Bellevue-Stratford; all of those in attendance were Philadelphians with the exception of Prof. E. F. Kelly and Mrs. Kelly, who came up from Baltimore.

Joseph W. England presided as toastmaster and contributed largely to the success of the evening's program. Dean Charles H. LaWall spoke of E. G. Eberle as "A student of the Philadelphia College of Pharmacy; William L. Cliffe paid tribute as a class-mate; George M. Beringer referred to his association activities; Chairman E. Fullerton Cook commented on his work on a prior U. S. P. revision and aid in the present revision; President W. Wilson McNeary, of the Alumni Association of the Philadelphia College of Pharmacy and Science, referred to the guest as one of the official family, and Editor Ivor Griffith, to his kindly coöperation. The Philadelphia Drug Exchange was represented by Walter V. Smith, who after the conclusion of his remarks presented the parting guest with a handsome traveling bag; Professor Cook, on behalf of those present, added a beautiful folding umbrella. Secretary E. F. Kelly spoke of the Editor's new home and the reception that would be accorded him in Baltimore. President M. M. Smith referred to Mr. Eberle's activities in the A. PH. A. Branch. Ex-President Ambrose Hunsberger, of the N. A. R. D., spoke of the esteem in which the guest of the evening is held by the N. A. R. D. members and Secretary Otto Kraus of the P. A. R. D. brought greetings of the local members; Dr. William Duffield Robinson expressed his regrets that it was necessary for Mr. Eberle to leave Philadelphia. Among others present besides those mentioned as speakers and members of their families were: Mr. and Mrs. Russell H. Blackwood, Mr. and Mrs. O. W. Osterlund, Mr. and Mrs. Jos. W. E. Harrisson, Dr. and Mrs. Arno Viehoever, Mr. and Mrs. J. C. Peacock, Messrs. W. H. Gano, Edward T. Hahn, Paul C. Olsen, John K. Thum, Prof. J. W. Sturmer, Dr. H. C. Wood. Letters and telegrams were received from Mrs. William E. Lee, Frank H. Rohrman, R. P. Fischelis, Richard H. Lackey, H. R. McIlvaine, Raymon Hendrickson, Henry Paul Busch, H. H. Whyte, President of H. K. Mulford Company, and C. Mahlon Kline, President Philadelphia Drug Exchange; Mrs. Martha Chiles, sister of Mrs. Eberle, A. E. Ryan, son, and Mrs. R. J. Thomas and Mrs. Lizzie Galbraith, nieces.

Mr. Eberle, in responding, thanked the Philadelphia friends and members for their kindness during the past ten years and said he looked back with happiness to the friendships formed in Philadelphia more than forty years ago. In his opinion the tributes were

expressed by the speakers in superlatives because of charitableness and friendly consideration. He assured them of his attachment and hoped they would not forget him. He spoke of the ASSOCIATION projects which had made the move necessary.

E. L. NEWCOMB BECOMES FIELD CONTACT MAN OF THE N. W. D. A.

Dr. E. L. Newcomb has become associated with the N. W. D. A. as Field Contact Man. He will continue and extend the services performed for the wholesale trade by F. E. Holliday. The former is also to study the distribution problems of the drug trade and assist in their solution, and further work is contemplated. In giving account of some of the activities of Dr. E. L. Newcomb the *Oil, Paint and Drug Reporter*, of December 21, said in part:

"Dr. Edwin Leigh Newcomb is of the oldest American-British stock, being a descendant of Capt. Andrew Newcomb, a seafaring immi-

E. L. NEWCOMB.

grant who lived at Boston in 1663, and of Governor William Bradford, of Plymouth Colony. In more recent times his great-great-grandfather was a quartermaster in the Revolutionary Army. He was born at Vineland, N. J., October 18, 1882, where his earliest botanical experience was gained as he sprayed fruit trees on his farther's farm. After going through high school he became a drug clerk and was graduated by the Philadelphia College of Pharmacy and Science in 1905. During his third year at college he was instructor in botany and pharmacognosy there, the first undergraduate to hold an instructorship at the college. He continued in this position until 1910, in the meantime doing special study in chemistry and German. The latter year he accepted a call from the department of pharmacy of the University of Minnesota, where he now fills the chair of botany and pharmacognosy.

"Dr. Newcomb has done much pioneer and constructive work among the pharmacists of the Northwest, and is one of the leading spirits in the matter of raising the headquarters building fund for the AMERICAN PHARMACEUTICAL ASSOCIATION. He also is editor of the *Northwestern Druggist*, and a member of the committees on revision of the United States Pharmacopœia and the National Formulary. He is a man of strong personality and great magnetism, and carries force and enthusiasm into any work he undertakes. In short, he is the kind of man who does things."

His energetic and enthusiastic promotion of the Headquarters is known to his associates and the membership at large. He is a tireless worker and communicates enthusiasm; he puts himself into the work undertaken by him. The ASSOCIATION has had his services in the project since the active campaign started and his time and energy were given as freely as though he had received financial compensation. The N. W. D. A. has made a good selection and, without authority to speak, it seems almost impossible that the subject of this sketch can withhold himself from participation in the great undertaking until after the Headquarters' Building becomes an actuality.

THE BUREAU OF CHEMISTRY TO STUDY METHODS OF ANALYSIS FOR DRUGS MORE INTENSIVELY.

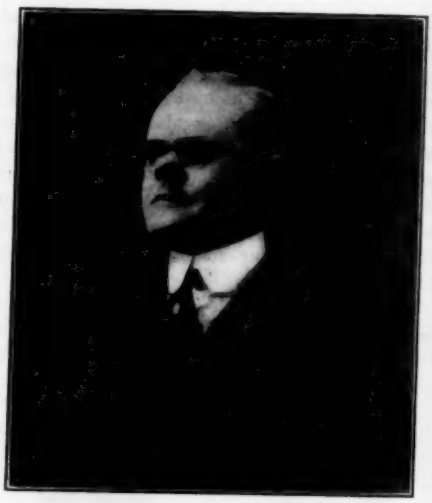
"Systematic research in methods for the analysis of drugs has been established recently on a more extensive scale in the Bureau of Chemistry of the United States Department of Agriculture," according to a recent announcement by officials of that bureau. "Work of this kind has been carried on in the Bureau of Chemistry for many years but it has now been taken up in a more intensive way in order that reliable methods for the analysis of drugs may be made more readily available to pharmaceutical chemists and laboratories interested in this important subject."

The work will consist largely in the critical revision of methods used in the analysis of drugs, including the identification and separation of potent medicinal substances in mixtures. It is proposed to try out new methods for the analysis of drug products, or those of uncertain status, by carefully controlled collaborative studies. Older methods will be critically reviewed and revised if necessary. Criticisms of unreliable methods will be published in the chemical and pharmaceutical journals. Unless known by long experience to be reliable, no method will be accepted until it has been subjected to trial under the most exacting conditions and to collaborative study with preparations of known composition. Acceptable methods will be embodied in monographs and published from time to time for distribution to those interested in the analysis or examination of drugs.

It is hoped by the officials that the aid of universities, colleges of pharmacy, and laboratories of pharmaceutical manufacturers as well as those of state and city drug officials may be enlisted to coöperate in this work by an exchange of information. It is especially desired to have the active coöperation of all pharmaceutical chemists and pharmaceutical laboratories. The progress and success of this undertaking will depend in some degree on the freedom and extent of the coöperation and collaboration given by such agencies as mentioned. Provision will be made for prompt distribution of information and data to those who are particularly interested.

Mr. L. E. Warren, who for a number of years has been associate chemist of the American Medical Association in Chicago, has been appointed to have immediate charge of this work. Mr. Warren is a graduate of the School of Pharmacy of the University of Michigan, and has had considerable experience in the manufacture and control of medicinal chemicals and pharmaceuticals, as well as many years of experience in the analysis and standardization of medicines. He was formerly employed as a drug analyst in the Bureau of Chemistry.

Many analysts and a large number of agencies, such as pharmacopœial revision committees, Government laboratories and the laboratories of pharmaceutical manufacturers, and schools of pharmacy are conducting all over the world researches in the chemistry of drugs. In this way a very extensive literature has accumulated. However, the methods are widely scattered in the literature in several languages and some of them are misleading and unreliable. Search of the literature often reveals several methods for the analysis of a medicinal substance, yet the analyst may have no way of determining which procedure is the most trustworthy without subjecting them all to trial. Sometimes no method applicable to the problem in hand can be found. Several books on the analysis of drugs and medicines have been published, but at present there is no comprehensive treatise in which the information in the literature has been brought together, critically examined, and coördinated for use.



L. E. WARREN.

STANDARDIZATION OF BIOLOGICAL STAINS.

The executive committee on Standardization of Biological Stains, affiliated with the National Research Council met at the Chemists' Club, New York City, November 20. Chairman H. J. Conn's report was concluded in part as follows:

"I think we can say without making immodest claims that we have already made a distinct contribution to science and to the independence of American science from European supplies. Without the financial assistance of the Chemical Foundation and the active interest of its president, only a small part of what we have actually accomplished would have been brought about."

CHIEF CHEMIST FOR BUREAU OF STANDARDS, DEPARTMENT OF COMMERCE.

The United States Civil Service Commission is to fill the position of chief of the chemistry division of the Bureau of Standards of the Department of Commerce, and, in view of the importance of the position to the whole field of chemical research, and to insure the appointment of a thoroughly qualified man for the work, an unusual method of competition will be followed to fill the vacancy. Instead of the usual form of civil service examination, the qualifications of candidates will be passed upon by a special board of examiners, composed of George K. Burgess, director of the Bureau of Standards; F. G. Cottrell, director of the Fixed Nitrogen Research Laboratory; W. A. Noyes, dean of chemistry of the University of Illinois; W. R. Whitney, chief of the research laboratory of the General Electric Company and Frederick W. Brown, examiner of the United States Civil Service Commission. The entrance salary is $5200.—*Oil, Paint and Drug Reporter.*

BIENNIAL CENSUS OF MANUFACTURES.

The Bureau of the Census is now engaged in collecting the data for the biennial census of manufactures, which will cover industrial operations during the calendar year of 1925. This census is required by an act of Congress approved March 3, 1919.

In preparing your schedules, care should be taken to answer each inquiry that applies to your operations. Do not combine items that are called for separately. If you can not give exact figures, careful estimates will be accepted by the Census Bureau. In answer to Inquiry 6, the value of production, *not sales*, is called for. The sales during the year may exceed considerably or may fall considerably below the production during the year. Where no exact records of production are kept, the value of the production for the year may be ascertained by adding to the value of goods sold, the increase in the stocks of finished goods (or stocks in the process of manufacture) on hand at the end of the year as compared with the beginning of the year, or by deducting the decrease in such stocks from the value of goods sold. For example, if the sales during the year amounted to $50,000 and the value of stocks on hand increased from $10,000 at the beginning of the year to $15,000 at its close, the value of the production during the year would be $55,000; but if the stocks on hand decreased from $10,000 at the beginning to $5000 at the end of the year, the value of production would be only $45,000.

These figures are published for the benefit of the manufacturing industry and the usefulness of census statistics is increased by making them available at an early date.

GIVE WHILE YOU LIVE.

In a series of articles describing public gifts made by the men and women in American cities it is said that "a spirit of civic patriotism aroused by a 'Give While You Live' speech, delivered by the late Mayor Robert W. Speer of Denver, Colo., upon his induction into office in 1916 is credited with being responsible in a large measure for many public benefactions which have added to the beauty of Denver, now recognized generally as one of the most attractive cities in the Nation.

"While Denver previously had been the beneficiary of numerous gifts, most of them were of posthumous character. Within two years from the date on which Mr. Speer delivered his compelling talk, gifts totaling $600,000 in value and covering a wide range were received by the city."

It is not our intention to force the proposition of giving to pharmacy while you live or to make provisions for posthumous gifts. But we do believe there are some, perhaps many, who would appreciate the suggestion and make a note. There are, doubtless, some men of means and others outside of pharmacy whose estimate of pharmacy would be strengthened if they were apprised of gifts by pharmacists for projects of pharmacy. Many pharmacists give while they live or by will to worthy promotions outside of pharmacy but, because they are part of pharmacy, provisions that would aid the cause of pharmacy, in one way or another, often are overlooked. We judge the service of other activities largely by the estimates of their votaries.

A NATIONAL ARBORETUM.

The movement to have the Department of Agriculture establish a national arboretum in Washington was given new life when Senator Pepper of Pennsylvania, on December 15, introduced the necessary legislation in the Senate.

Under Senator Pepper's bill the arboretum would be developed along the Anacostia River north of Benning's Bridge. It would be administered by the Secretary of Agriculture separately from the agricultural, horticultural and forestry stations of the department, but co-related to those branches in such a way as to obtain the best results in research and discovery.

The bill authorizes the President to turn over to the Secretary of Agriculture for the arboretum any land already owned by the United States in the area designated and further authorizes an appropriation of $300,000 to enable the Secretary, in his discretion, to acquire other land by purchase or condemnation.

The head of the Agriculture Department would be authorized to consult in conducting the arboretum with an advisory council to be made up of representatives of the following organizations: The National Academy of Sciences, the National Research Council, Smithsonian Institution, Carnegie Institution of Washington, Garden Club of America, Wild Flower Preservation Society, Botanical Society of America, American Society of Landscape Architects, American Association of Nurserymen, National Association of Audubon Societies, American Forestry Association, Society of American Foresters, AMERICAN PHARMACEUTICAL ASSOCIATION and the American Association for the Advancement of Science.

PERSONAL AND NEWS ITEMS.

Dr. A. G. DuMez—of the Hygienic Laboratory, Washington, D. C.—has been appointed dean of the School of Pharmacy, University of Maryland, succeeding **Dean E. F. Kelly,** who is now the full-time Secretary of the AMERICAN PHARMACEUTICAL ASSOCIATION. As is well known by our members the new dean is Reporter on the Progress of Pharmacy and conducts the "Bibliography of Pharmaceutical Research" in the JOURNAL. Dean DuMez assumes the duties of office about February 1. Dr. DuMez organized and was head of the Department of the University of the Philippines for a number of years. For sketch see JOUR. A. PH. A., October 1922.

The American Society of Bacteriologists met in Madison, Wis., December 29–31. On this occasion former President of the University E. A. Birge, and William Trelease, formerly of the department of botany and for many years at Shaw's Garden, St. Louis, were present; they spoke on "The Beginnings of Bacteriology in the Middle West." The first work in bacteriology carried on at the University of Wisconsin was done by Dr. Trelease about 43 years ago, and the first formal course in the science was begun three years later under Dr. Birge.

John K. Caldwell, assistant chief of the division of Far Eastern affairs, Department of State, has been appointed to represent that department on the Federal Narcotics Control Board's committee of experts. He succeeds Mr. Norris of the solicitor's office, Department of State, in that capacity. The latter has resigned from the service. Mr. Caldwell is an officer of the foreign service, class 3. He has served twenty years under the State Department, beginning his career as student interpreter at Tokyo, serving elsewhere in Japan, Siberia and the Orient, as well as here in the department.

Dr. Albert Schneider held forth in one of the Sunday editions of the press, in which he was accredited with the statement that the span of life should be about 500 years.

Dr. and Mrs. José P. Alacan have announced the marriage of their daughter Sylvia and Dr. Francisco E. Borgas, at Havana, Cuba, December 25. Mrs. Borgas is a graduate of the Philadelphia College of Pharmacy and Science, and is a member of the AMERICAN PHARMACEUTICAL ASSOCIATION.

Dr. and Mrs. Samuel Lewis Hilton, of Chevy Chase, Md., announce the marriage on November 25, of their daughter Virginia Claire Williams to William Henry O'Brien. Mr. and Mrs. OBrien are at home in Lynbrook, N. Y.

The *Merrell Messenger* has a page of pharmaceutical teachers at Des Moines, in the October number.

Miss Evana Hopp, daughter of the late **Lewis C. Hopp,** is attending Columbia Extension School.

The Senate has confirmed the nomination of L. C. Andrews as Assistant Secretary of the Treasury, in charge of prohibition enforcement.

Secretary Charles L. Parsons, of the American Chemical Society, has been created an officer of the Legion of Honor by the French Government. The presentation of the cross was made by the French ambassador at Washington recently.

Secretary E. F. Kemp, in discussing statistics relating to the manufacture of "patent" medicines, said that "on the basis of the most

recent figures, a total of 2,241 concerns engaged in the business. These figures also show that of the total given, 1,396 concerns, or about 62 per cent., do less than $20,000 a year gross business. They further show that over 28 per cent. of the manufacturers engaging in the making of drug products fail to do an annual gross business of more than $100,000.

"In a manufacturing sense a business which does only $5,000 a year gross is a loss. A business doing $20,000 a year cannot make a return on the invested capital—yet here is included 62 per cent of the concerns that make proprietary products."

NORTHWEST DRUG EXPOSITION.

The fourth annual Northwest Drug Exposition will be held in Des Moines, February 23–26. The manager is Denny Brann, who took an active part on the Local Committee of the A. PH. A. convention in Des Moines. The annual meeting of the Iowa Pharmaceutical Association will convene during the same week and the exposition is held under the auspices of the Druggists' Association of Polk County and the Northwest Druggists Bureau composed of the pharmaceutical associations of Iowa, Minnesota, Wisconsin, North and South Dakota.

The Iowa Pharmaceutical Association will hold its meetings in connection with this Exposition and its meetings are held in the mornings only. The Exposition is open to druggists in the afternoons, and in the evenings it is thrown open to the public. This follows the method of previous meetings. It gives the druggists an opportunity to attend all the meetings and suits the exhibitors.

PUBLIC LECTURES OF PHILADELPHIA COLLEGE OF PHARMACY AND SCIENCE.

The January lectures of the Philadelphia College of Pharmacy and Science, at Young Men's Christian Association, are scheduled for the 7th and 21st. The first is by E. Fullerton Cook on "Delectable Confections" and the second on "Some Things Not Often Said about Milk," by David Wilbur Horn.

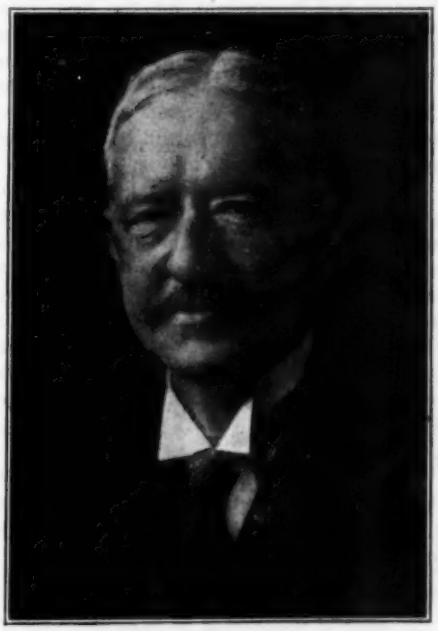
OBITUARY.

HARRY BANKS FRENCH.

Harry B. French, chairman of the board of directors of Smith, Kline & French Company, Philadelphia, died December 22, of pneumonia, aged sixty-eight years. He was for several years President of the Philadelphia Drug Exchange and a member of the AMERICAN PHARMACEUTICAL ASSOCIATION since 1890.

Mr. French received his preliminary education at a military academy in New Haven and, later, he studied at the Universities of Pennsylvania and Harvard. Thereafter he became associated with French, Richards & Co., and when this firm was dissolved he was named Vice-President of the newly-organized firm of Smith, Kline & French Company. He became President of the Company after the demise of Mahlon N. Kline.

An editorial of a Philadelphia paper follows: "Harry Banks French was a type of the man of liberal education and large affairs who holds that he owes it to his community and to his fellow-citizens, as well as to his own self-respect, to continue against whatever odds the effort for the improvement of civic and political conditions. He gave lavishly of his means and his personal effort, with no thought of reward in office or the praise of men, for



HARRY B. FRENCH.

though he was President of the Municipal League and was prominently identified with reform movements, he did not advertise his own contribution toward the public welfare; and while his opinions were fearlessly outspoken, he never sought the spotlight of notoriety. He proved that a man can resist influential politicians and still be successful in business, yet he never considered the effect of his acts or his views on his own fortunes."

The Protestant Episcopal Church of the Good Shepherd at Rosemont, Pa., was erected by Mr. French in 1894 in memory of his first wife, Augusta (Graham) French. He was very active in church affairs until the time of his death.

Mr. French is survived by his second wife, Elizabeth E. French, two sons, Clayton French and Graham French, and two daughters Mrs. Thomas Wallace, Prospect, Ky., and Mrs. Pearson Church Cummin, Devon, Pa.

He was a member of the Art Club, City Club, Harvard Club, Bachelors' Barge Club, Philadelphia Country Club, Merion Cricket Club and Church Club, and the Radnor Hunt.

SOCIETIES AND COLLEGES.

PHI DELTA CHI TO MEET IN CHICAGO.

The twenty-sixth annual Grand Council of the Phi Delta Chi fraternity (Chemistry-Pharmacy) will be held at the Allerton House, 701 N. Michigan Ave., Chicago, on the 11th, 12th and 13th of February, 1926. On account of the importance of the questions to be considered at this meeting and due to the convenience of Chicago to a large share of the membership of the Fraternity, it is expected that this Grand Council will see the best attended meeting that the Fraternity ever has held.

Chapter representatives from two new chapters will be present for the first time. These chapters have been installed at the University of Maryland and the Medical College of Virginia since the 1925 Grand Council. Twenty-six chapters from all sections of the United States will be represented by two or more delegates.

During the past year the Fraternity has continued with the publication of its quarterly magazine, "The Communicator," and has issued monthly for members only a new pamphlet "The Communicalendar." As the name implies, this is intended to carry advance notice of dates of various events throughout the Fraternity of interest to the alumni membership. Both publications are edited by R. P. Hollenback, 3134 North High St., Columbus, Ohio.

Grand Council arrangements are being made by the Grand Secretary of the organization, L. C. Heustis, 1662 Bellefontaine St., Indianapolis.

ORGANIC CHEMISTRY SYMPOSIUM.

A national symposium on organic chemistry was held December 29 to 31 at Rochester under the auspices of the Division of Organic Chemistry of the American Chemical Society. Prof. Marston T. Bogart, of Columbia, chairman of the division, presided. A partial list of papers follows:—

"The Causation of Organic Reactions at the Surfaces of Solids," Homer B. Adkins, University of Wisconsin.

"Researches in the Thiazole and Selenazole Groups," Marston T. Bogart, Columbia University.

"Certain Developments in the Chemistry of Free Radicals," James B. Conant, Harvard University.

"Some Practical Criteria of the Purity of Crystalline Organic Compounds," John Johnston, Yale University.

"Quantitative Measurement of Chemical Reactivity of Organic Compounds," James F. Norris, Massachusetts Institute of Technology.

OFFICERS OF ARIZONA ASSOCIATION.

The officers elected at the meeting of the Arizona Pharmaceutical Association, in Yuma, are as follows:

President, E. C. Stultz, Phoenix.

Vice-President, Charles Conners, Jerome.

Secretary-Treasurer, Arthur G. Hulett, Phoenix.

Executive Committee, J. Homer Smith, A. B. Pulvis, J. D. Weber, A. C. Crouch, Chas. Freeman. Phoenix was selected for the 1926 meeting.

W. Bruce Philip, past chairman of the House of Delegates, A. PH. A., was one of the speakers.

OFFICERS IDAHO ASSOCIATION.

The officers elected by the Idaho Association at Pocatello are as follows:

President, John E. Holmes, St. Anthony.
Vice-Presidents, Roy Hermon, A. B. Colwell, H. T. Emmet.
Secretary, J. C. Anderson, Boise.
Treasurer, Orville Jackson, Eagle.

Boise was chosen for the 1926 meeting. John Culley, of Ogden, was one of the speakers of the convention.

OFFICERS OF DISINFECTANT MANUFACTURERS' ASSOCIATION.

The following officers were elected at the 12th annual convention of the Insecticide and Disinfectant Manufacturers' Association:

President, Frederick A. Hoyt.
First Vice-President, H. W. Hamilton.
Second Vice-President, Evans E. A. Stone.
Treasurer, Robert J. Jordan.
Secretary, H. W. Cole.

OFFICERS OF BALTIMORE DRUG EXCHANGE.

The following officers were elected at the 21st annual meeting of the Drug Exchange Bureau of the Baltimore Association of Commerce, December 14th:

President, H. H. Robinson.
First Vice-President, Horace Burrough.
Second Vice-President, Philip I. Heuisler.
Secretary, William J. Lowry.
Treasurer, J. Emory Bond.
Executive Committee, Willoughby M. McCormack, William A. Sailer, John C. Muth.

The Bureau went on record as opposing a piecemeal reduction of the tax on alcohol, though it has declined to take a position for or against the proposed reduction.

THE PHARMACIST AND THE LAW.

One of the inconveniences connected with free government is the voluminous code of laws. Last year forty states passed more than 13,000 laws, many of which are substitutes or amendments of prior measures. We are told that Washington State passed a law authorizing schools for teaching the art of hair dressing and facial massage, licensing persons to carry on the practice and providing penalties for violation. Illinois made provision for rewarding man, woman or child for capturing or killing a bank robber. Ohio provided for the daily reading of ten verses from the Bible, without comment, another state requires memorizing of the Ten Commandments. In New York 3186 measures were offered and 686 of these became laws; in another state 1773 measures were presented of which 1173 were enacted.

METRIC STANDARDS BILL UP IN CONGRESS.

One of the first bills introduced in the new Congress is the Metric Standards Bill (H. R. 10), sponsored by Fred A. Britten, Representative from Illinois. It provides for the gradual adoption of metric units of weights and measures in merchandising throughout the United States after a transition period of 10 years.

Under the proposed law, manufacturers will continue to use any measures they desire in production, but commercial transactions are to be on the decimal basis, already employed to advantage in United States coinage. The Britten Bill establishes familiar terms for the main metric units, for the meter may be called the "world yard," the liter "world quart" and 500 grams "world pound."

The states of Illinois, California, North Dakota, Tennessee and Utah through their legislatures have memorialized Congress to pass such a metric law. Metric advocates declare that adoption of the world standard units will benefit internal and world trade, education, agriculture and household economy.

PRICE MAINTENANCE BILL.

Representative Clyde Kelly has introduced H. R. 11 into the House of Representatives; it has been referred to the Committee on Interstate and Foreign Commerce. The bill reads:

A BILL.

To clarify the law, to promote equality thereunder, to encourage competition in production and quality, to prevent injury to good will, and to protect trade-mark owners, distributors and the public against injurious and uneconomic practices in the distribution of articles of standard quality under a distinguishing trade-mark, name, or brand.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That in contracts relating to the sale or resale of an article of commerce the genuineness of which is attested by the trade-mark or special brand

of any grower, producer, manufacturer, or other trade-mark proprietor, who is in fair and open competition, actual or potential, with other growers, producers, manufacturers, or owners of similar or competing articles, which contracts are made by the owner of such articles, hereinafter referred to as the vendor, with wholesale or retail dealers, hereinafter referred to as vendees, whenever such contracts constitute transactions of commerce among the several States, or with foreign nations, or with or in any district or Territory subject to the jurisdiction of the United States, it shall be lawful for such vendees to agree to sell such articles at the prices prescribed by such vendor and such agreements shall not be construed as against public policy or in restraint of trade or in violation of the Act of Congress of July 2, 1890, or of any of the Acts supplemental thereto: *Provided*,

(*a*) That any such article may be sold by the vendee at a price other than that prescribed by the vendor (1) if such vendee shall in good faith discontinue dealing in such article, or (2) if such vendee shall cease to do business and shall propose to sell such article in the course of discontinuance of such business, or (3) if such vendee shall have become bankrupt or a receiver shall have been appointed for his business: *Provided*, That such article shall have first been offered to such vendor by such vendee or his trustee in bankruptcy or receiver at the price paid therefor by such vendee, and that such vendor, after reasonable opportunity to inspect such article, shall have refused or neglected to accept such offer.

(*b*) That any such article which shall have become damaged or deteriorated in quality may be sold by such vendee at a price other than that prescribed by such vendor: *Provided*, (1) That such article shall have been offered to the vendor either in exchange for a new article of the same kind, or at the price paid therefor by such vendee, and (2) that such vendor after reasonable opportunity to inspect such article shall have refused or neglected to accept such offer, and (3) that such article shall be sold by such vendee only with prominent notice to the public that the price of such article has been reduced because it is damaged or deteriorated in quality, as the fact may be.

LIQUOR MAY NOT BE USED IN FLAVORS AND MEDICINES AFTER FEBRUARY 1.

Effective February 1, 1926, use of whisky, brandy, or gin in medicinal preparations, flavoring extracts, toilet waters and such articles mentioned in section 4 of title 2 of the prohibition law, is forbidden under new regulations issued by the Treasury Department as T. D. 3787. But the withdrawal of alcohol and wine for that purpose will be authorized, as well as withdrawal of whisky, rum or brandy, "for use in particular cases in which the formula has heretofore been approved by the department." In considering applications in such cases, "the length of time which the permittee has operated his general business, the length of time he has used this particular formula, its relation to other formulas used by him and to the formulas for manufactured products generally in which alcohol or wine is used, and the quantity of spirits used in the manufacture of the article, will be taken into account."

The new ruling provides further that it shall not be construed in any wise "to limit or restrict the use of whisky, brandy and other distilled spirits for use in the treatment of diseases on physicians' prescriptions, form 1403; or their use by retail druggists in compounding prescriptions in accordance with the terms of their permits."

ALCOHOL PERMIT RULING.

Prohibition administrators are authorized by T. D. 3784 to suspend withdrawals of spirits by permittees at the time of the issuance of a citation for revocation in any case under sections 5 and 9 of the national prohibition law or regulations thereunder, "and to the same extent as may be done by the Commissioner of Internal Revenue in person." The new ruling, accordingly, revokes section 1903 of regulations 60 "and all other regulations inconsistent therewith to the extent of such inconsistency." Under the Andrews reorganization, prohibition administrators were assigned the duty of granting or refusing permits and the new decision authorizes them to deal with suspension of withdrawals as well as with revocations.—*Oil, Paint and Drug Reporter.*

ALCOHOL TAX REDUCTION APPROVED BY THE HOUSE.

Provision for the sliding reduction of the tax on non-beverage spirits was retained in the revenue revision bill when it passed the House of Representatives. The house rejected an amendment without committee sanction which would have taxed denatured alcohol at the rate of 1 cent a gallon, and adopted an amendment offered by Representative Green, chair-

man of the Ways and Means Committee, making it clear that the internal revenue tax on spirits shall apply to imported spirits in addition to the duty thereon and that smuggled spirits shall be held to be imported spirits and subject to such tax. Mr. Green explained that the necessity for this amendment arose from a department of justice ruling for the sale of seized smuggled alcohol by United States marshals free of tax.

CRAMTON BILL IN CONGRESS.

The Cramton Bill will again have its day in Congress. It is said Mr. Cramton doubts that hearings on the Bill are necessary this session of Congress in view of the voluminous character of the hearings held on it last Congress. He is expected to press it before the House judiciary committee before many weeks, but if the matter is to be taken up the alcohol trades will insist upon having hearings to present their opposition to the bill.

ALCOHOL TRADES ADVISORY COMMITTEE HAS ASKED TO BE RELIEVED.

D. H. Blair, Commissioner of Internal Revenue, is understood to have indicated his willingness to have the Alcohol Trades Advisory Committee liquidated. The committee, since the reorganization of the prohibition service under L. C. Andrews, Assistant Secretary of the Treasury, has not been called upon to function with regard to a number of treasury rulings, decisions and regulations.

BOOK NOTICES AND REVIEWS.

Chemistry in Modern Life. By Svante Arrhenius. Translated from the Swedish and revised by Clifford S. Leonard, pp. xiii—286. D. Van Nostrand & Co., N. Y., 1925. Price $3.00.

This splendid volume representing the last addition to the recently proposed Library of Modern Sciences, is truly a masterful contribution to technical literature. The work was originally intended to serve as a non-technical exposition of the romance of chemistry in its magnanimous applications in modern industry. However, a thorough inspection of the work, impelled by reading the interestingly written themes, discloses the book to be rather more valuable as a technical reference or collateral text instead of a popular exposition as anticipated by the writer. The numerous monographs commence with historical data incident to the ancient conceptions regarding the constitution of matter and progress through the subsequent developments in chemistry, pure and applied, up to and including the modern present age of Electro chemistry.

These topics, intended for the average non-technical reader, in reality present fundamental principles with a lucidity far excelling many textbooks devoted exclusively to any of the purely scientific themes in particular. The reviewer in this instance refers to the chapters, "Energy," "Electricity and Chemistry," and "The Course of Chemical Reaction."

These chapters deal with the laws of physics as applied to the interpretation of certain chemical phenomena. The research accomplishments and prolific scientific contribution of Guldberg and Waage, Hittdorf, Van't Hoff, Helmholz, Ostwald and others, are duly credited and presented in a manner readily comprehended. Fundamental laws of Mass Action, Transport Velocity in Migration of Ions, Potential Series, etc., are a few of the topics introduced.

Professor Arrhenius reveals his modesty in never referring to his epoch-making contributions to electro-chemistry, while the translator of his own accord mentions the excellent work of the Swedish savant in the province of Immunology.

The data comprising the chapter on Dyes, Perfumes and Drugs, is within the scope of the book, briefly treated, and presents very little new material of pharmaceutical importance, yet is ably and interestingly discussed.

In view of the decadent professional attitude of the average practitioner of American pharmacy, this little volume is as a pearl discarded. Its value will be fully appreciated by the pharmaceutical, industrial and professional chemist, and students generally, and represents a valuable acquisition to technical literature of 1925. SIMON MENDELSOHN.

Entwicklung und Stand der Pharmazeutischen Grossindustrie Dentschlands. Von Dr. Johann Heinrich Merck ans Darmstadt. Octavo 89 pp. Georg Stilke, Berlin, N. W. 7.

Who in the pharmaceutical, medical, chemical and technological realm does not know the name of Merck in Darmstadt, a firm over 250

years old and with a world wide reputation? This text was written as a thesis by a younger member of the Merck family. Among the 8 chapters I want to print out the following: History of Pharmacy, Crude Drugs, Scientific and Technical Education of the Chemist, Chemical and Pharmaceutical Industry and The Commercial War.

Prof. Dr. Hans Th. Bucherer in Charlottenburg, an uncle of the author, wrote the introduction to the Thesis, which also furnishes numerous references to the literature on this subject, occupying two pages.

OTTO RAUBENHEIMER, PH.M.

THE NATIONAL ACADEMY OF SCIENCES AND THE NATIONAL RESEARCH COUNCIL OF THE UNITED STATES ANNOUNCE THE FORTHCOMING PUBLICATION OF INTERNATIONAL CRITICAL TABLES OF NUMERICAL DATA OF PHYSICS, CHEMISTRY AND TECHNOLOGY.

In making the publication contract, the National Research Council has reserved to members of scientific and engineering societies, and to libraries and research laboratories, for a certain period, the right to purchase the volumes at the estimated manufacturing cost.

The work of compiling International Critical Tables was undertaken by the National Research Council at the request of the International Union of Pure and Applied Chemistry, with the endorsement of the International Union of Pure and Applied Physics, and under the auspices of the International Research Council.

The material contained in International Critical Tables has been collected and critically evaluated by some 300 Coöperating Experts, including chemists, physicists, and engineers of the United States, Canada, Great Britain, Belgium, France, Italy, Austria, Germany, Denmark, Switzerland, Holland, Australia and Japan.—The address of the National Research Council is B & 21st St., Washington, D. C.

CHEMICAL BIBLIOGRAPHIES.

A Bibliography of Bibliographies on Chemistry and Chemical Technology, 1900–1924, by Clarence J. West and D. D. Berolzeimer, is announced by the National Research Council, Washington, D. C., as their Bulletin No. 50 (308 pp., $2.50). This work is composed of the following sections: General Bibliographies, Abstract Journals and Year-Books, General Indexes of Serials, Bibliographies of Special Subjects and Personal Bibliographies. As the title indicates, the work is a compilation of bibliographies published as separates, or at the end of books or magazine articles, or as footnotes to the same, on the numerous aspects of pure and applied chemistry. Each entry gives name of author or compiler, title and place of publication. The majority of the entries state the number of references, thus giving an indication of the completeness of the particular bibliography. The entries are classified under the proper subject-headings, alphabetically arranged. The duplication of individual entries has been largely avoided by the liberal use of cross-references. An approximate analysis shows that there are about 2400 subject headings, 7500 author entries and a total of 10,000 individual bibliographies. Although no claim is made for the completeness of the compilation, it is believed that the work will furnish a convenient starting point for any bibliographic search.

GREECE OPIUM MONOPOLY.

A government monopoly has been established in Greece for the importation and sale of narcotics (opium, cocaine, etc.) by a recently published decree according to the Department of Commerce. Purchases of all these products will be effected solely for the account of the state which will distribute them to the druggists and pharmacists authorized to sell them. Prices will be fixed by the government and the cultivation of poppies in Greece is to be regulated by special permit from the Ministry of Finance.

HOXIDE CANCER INSTITUTE SUES AMERICAN MEDICAL ASSOCIATION.

Damages of $100,000 are sought in a suit for alleged libel filed against the American Medical Association by the Hoxide Cancer Institute. The action is said to be based on a criticism of the institute printed in the January 2 issue of the *Journal of the American Medical Association*.—A public press item.

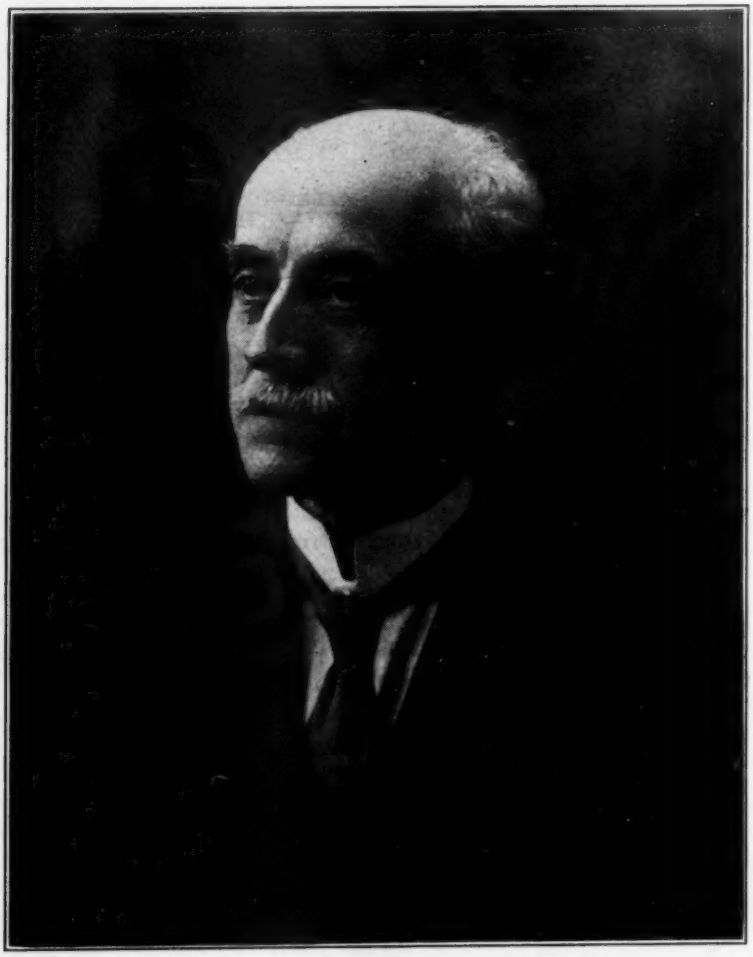
PENNSYLVANIA MUSEUM GETS BEQUEST.

By the will of John D. McIlheny the Pennsylvania Museum and School of Industrial Art (Philadelphia) will receive a gift of $100,000.

EDWARD AUGUSTUS SAYRE

EAST ORANGE, N. J.

Member of the AMERICAN PHARMACEUTICAL ASSOCIATION since 1877



E. A. SAYRE.